

Baillon comments, further, as follows: "Pour nous, il n'est pas douteux qu'il s'agit d'un *Stachytarpheta* Vahl. [sic] appartenant aux mêmes groupes que *S. mutabilis* Vahl. [sic] et *S. orubica* Vahl. [sic] (du Bresil); il ne diffère guère de celui-ci que par la glabréité. Nous le nommons provisoirement *Stachytarpheta dichotoma* (Bn.) A. Chev. et nous le regardons comme non autochtone dans l'Archipel capverdien. Ainsi disparaît le seul genre que nous considérons comme endémique."

Not having had the opportunity of studying any authentic material of this taxon, I am enable to judge its validity. More collecting in the type region is certainly required. It is perhaps worth pointing out, however, that neither *Bouchea* Cham., *Chascanum* E. Mey., nor *Svensonia* Mold. are as yet known from Senegal, the nearest country to the Cape Verde Islands, lying, as it does, just east of them -- and the only *Stachytarpheta* known from there is *S. angustifolia* (Mill.) Vahl, a species very different from the illustration given by Chevalier and the stated characters of *Ubochea dichotoma*.

ADDITIONAL NOTES ON THE GENUS *VITEX*. XIX

Harold N. Moldenke

VITEX CAPITATA Vahl

Additional bibliography: Mold., *Phytologia* 48: 419. 1981.

Additional citations: VENEZUELA: Amazonas: *Steyermark & Redmond 117087* (Ld). Apure: *Davidse & González 15628* (Ld). Barinas: *Gentry, Morillo, & Morillo 11148* (Ws). Guárico: *Aristeguita & Agostini 4183* (N); *Ramírez 65* (Ld). BRAZIL: Bahia: *Mori, Mattos, Silva, Santos, Kallunki, & Pennington 9441* (N); *Mori, Silva, Kallunki, & Santos 9925* (N).

VITEX CARBUNCULORUM Smith & Ramas

Additional bibliography: Mold., *Phytologia* 44: 399. 1979; Mold., *Phytol. Mem.* 2: 274, 287, & 589. 1980.

VITEX CARVALHI Gürke

Additional bibliography: Mold., *Phytologia* 44: 389 & 399. 1979; Mold., *Phytol. Mem.* 2: 231, 241, & 589. 1980.

VITEX CAULIFLORA Mold.

Additional bibliography: Mold., *Phytologia* 44: 399. 1979; Mold., *Phytol. Mem.* 2: 251 & 589. 1980.

VITEX CAULIFLORA var. *LONGIFOLIA* Mold.

Additional bibliography: Mold., *Phytologia* 44: 399. 1979; Mold., *Phytol. Mem.* 2: 251 & 589. 1980.

VITEX CAULIFLORA var. *VILLOSISSIMA* Mold.

Additional bibliography: Mold., *Phytologia* 44: 399--400. 1979; Mold., *Phytol. Mem.* 2: 251 & 589. 1980.

VITEX CESTROIDES J. G. Baker

Additional bibliography: Mold., *Phytologia* 44: 400. 1979; Mold., *Phytol. Mem.* 2: 251 & 589. 1980.

VITEX CHARIENSIS A. Chev.

Additional bibliography: Mold., *Phytologia* 44: 400. 1979; Mold., *Phytol. Mem.* 2: 217 & 589. 1980.

VITEX CHARIENSIS var. *LATIFOLIA* A. Chev.

Additional bibliography: Mold., *Phytologia* 44: 400. 1979; Mold., *Phytol. Mem.* 2: 217 & 589. 1980.

VITEX CHRYSLERIANA Mold.

Additional bibliography: Mold., *Phytologia* 44: 400. 1979; Mold., *Phytol. Mem.* 2: 171 & 589. 1980.

VITEX CHRYSOCARPA Planch.

Additional bibliography: Mold., *Phytologia* 44: 400 & 479. 1979; Mold., *Phytol. Mem.* 2: 201, 205, 207, 209, 211--213, 221, 236, & 589. 1980.

VITEX CHRYSOMALLUM Steud.

Additional bibliography: Mold., *Phytologia* 44: 400. 1979; Mold., *Phytol. Mem.* 2: 251 & 589. 1980.

Gentry refers to this plant as a treelet, 3 m. tall, with yellow "flowers" [corollas], exserted stamens, red anthers, and green fruit in April, and found it growing on sand in a scrubby forest at sealevel.

Additional citations: MADAGASCAR: A. Gentry 11358 (E--2737779).

VITEX CHRYSOMALLUM var. *LONGICALYX* Mold.

Additional bibliography: Mold., *Phytologia* 44: 400. 1979; Mold., *Phytol. Mem.* 2: 251 & 589. 1980.

VITEX CHRYSOMALLUM var. *TOMENTELLA* Mold.

Additional bibliography: Mold., *Phytologia* 44: 400--401. 1979; Mold., *Phytol. Mem.* 2: 251 & 589. 1980.

VITEX CILIATA Pierre

Additional bibliography: Mold., *Phytologia* 44: 401. 1979; Mold., *Phytol. Mem.* 2: 216, 217, & 589. 1980.

VITEX CILIO-FOLIOLATA A. Chev.

Additional bibliography: Mold., *Phytologia* 44: 401. 1979; Mold., *Phytol. Mem.* 2: 210 & 589. 1980.

VITEX CLEMENTIS Britton & P. Wils.

Additional bibliography: Mold., *Phytologia* 44: 401. 1979; Mold.,

Phytol. Mem. 2: 91 & 589. 1980.

VITEX COCHINCHINENSIS Dop

Additional bibliography: Mold., Phytologia 44: 401. 1979; Mold., Phytol. Mem. 2: 294 & 589. 1980.

VITEX COFASSUS Reinw.

Additional bibliography: Kosterm., Reinwardtia 1: 104 & 106. 1954; Fosberg, Sachet, & Oliver, Micronesica 15: 238. 1979; Fosberg, Otobed, Sachet, Oliver, Powell, & Canfield, Vasc. Pl. Oalau 38. 1980; Mold., Phytologia 45: 481 (1980), 46: 486, 489, & 491 (1980), and 47: 19. 1980; Mold., Phytol. Mem. 2: 310, 311, 319, 321, 323, 324, 328--330, 366, 394, 457, & 589. 1980; Mold., Phytologia 47: 355. 1981.

Recent collectors describe this plant as a medium-sized tree, 5--15 m. tall, with a 1-meter bole, the trunk diameter 30 cm. at breast height, the outer bark brown or light-brown and flakey, the inner bark cream or cream-yellow, the wood yellow-straw color, the leaves dark-green above, pale-green beneath, the flowers terminal, and the unripe fruit light-green. The corollas are said to have been "purple-white" on *Karenga* & al. LAE.73848 and "light-purple" on *Wiakabu* & *Hausari* LAE.70358. It has been collected in flower and fruit in January at 77 m. altitude.

Additional citations: NEW GUINEA: Northeast New Guinea: *Kerenga* & al. LAE.73848 (Mu); *Wiakabu* & *Hausari* LAE. 70358 (Mu,W-2894968).

VITEX COFASSUS f. *ANOMALA* Mold.

Additional bibliography: Mold., Phytologia 44: 405. 1979; Mold., Phytol. Mem. 2: 319, 323, 324, 366, & 589. 1980.

VITEX COFASSUS var. *PUBERULA* H. J. Lam

Additional bibliography: Mold., Phytologia 44: 405. 1979; Mold., Phytol. Mem. 2: 328, 329, & 589. 1980.

VITEX COLUMBIENSIS Pittier

Additional bibliography: Mold., Phytologia 45: 482. 1980; Mold., Phytol. Mem. 2: 112 & 589. 1980.

VITEX COMPRESSA Turcz.

Additional bibliography: Mold., Phytologia 45: 482 (1980) and 47: 17. 1980; Mold., Phytol. Mem. 2: 103, 104, 112, 121, 123--126, 171, 366, & 589. 1980.

Recent collectors have found this plant growing in disturbed primary forests, at 250 m. altitude, flowering and fruiting in June, and describe it as a tree, 15--16 m. tall, the trunk 80 cm. in diameter at breast height, the leaves light yellowish-green on both surfaces, the calyx rose-maroon. Delascio & Liesner found it on "sabanas de lomas con matorrales deciduos". The corollas on *Liesner* & al. 8421 are said to have been "blue with a yellow patch at base of lower lip" and on *Blanco* 863 "white, the large lobe purple within".

The *Steyermark* & *Manara* 107898, distributed as typical *V. com-*

pressa, actually represents *f. angustifolia* Mold.

Additional citations: VENEZUELA: Bolívar: *Bernardi* 7400 (W--2946041); *C. Blanco* 839 (E--2774726), 863 (E--2774727); *Delascio & Liesner* 7404 (E--2774718). Falcón-Lard: *Liesner, González, & Wingfield* 8421 (Ld).

VITEX COMPRESSA f. ANGUSTIFOLIA Mold., *Phytologia* 47: 17. 1980.

Bibliography: Mold., *Phytologia* 47: 17. 1980; Mold., *Phytol. Mem.* 2: 121 & 589. 1980.

Steyermark & Manara describe this plant as a tree, 5 m. tall, the calyx "dull-purple with gray-green, the corolla pale-lavender" and the filaments "white with lilac", and have encountered it at sealevel to 20 m. altitude, flowering in September. Material has hitherto been confused with and distributed as typical *V. compressa* Turcz.

Citations: VENEZUELA: Falcón: *Liesner, González, & Wingfield* 8279 (Z--type). Arapo Island: *Steyermark & Manara* 107898 (N).

VITEX CONGENSIS A. Chev.

Additional bibliography: Mold., *Phytologia* 44: 407. 1979; Mold., *Phytol. Mem.* 2: 221 & 589. 1980.

VITEX CONGESTA Oliv.

Additional bibliography: Mold., *Phytologia* 44: 407. 1979; Mold., *Phytol. Mem.* 2: 251 & 589. 1980.

VITEX CONGOLENSIS DeWild. & Th.-Dur.

Additional bibliography: Mold., *Phytologia* 44: 407--408. 1979; Mold., *Phytol. Mem.* 2: 209, 214, 221, 234, & 589. 1980.

VITEX CONGOLENSIS var. *GILLETTII* (Gürke) Pieper

Additional bibliography: Mold., *Phytologia* 44: 408. 1979; Mold., *Phytol. Mem.* 2: 221 & 589. 1980.

VITEX COOPERI Standl.

Additional bibliography: Mold., *Phytologia* 45: 482 (1980) and 46: 10. 1980; Mold., *Phytol. Mem.* 2: 73, 76, 80, 82, 84, & 589. 1980; Seymour, *Phytol. Mem.* 1: 246. 1980.

VITEX COURSI Mold.

Additional bibliography: Mold., *Phytologia* 44: 409. 1979; Mold., *Phytol. Mem.* 2: 251 & 589. 1980.

Gentry has found this plant growing in a mostly native forest with *Eucalyptus*, at 1000 m. altitude.

Additional citations: MADAGASCAR: A. Gentry 11252 (E--2737773).

VITEX CRENATA A. Chev.

Additional bibliography: Mold., *Phytologia* 44: 409--410. 1979; Mold., *Phytol. Mem.* 2: 217 & 589. 1980.

VITEX CUSPIDATA Hiern

Additional bibliography: Mold., *Phytologia* 44: 410. 1979; Mold.,

Phytol. Mem. 2: 217, 221, 234, & 589. 1980.

VITEX CYMOSA Bert.

Additional bibliography: Mold., Phytologia 45: 482 (1980) and 46: 35, 38, & 39. 1980; Mold., Phytol. Mem. 2: 84, 102, 112, 121, 136, 171, 176, 179, 193, 366, & 589. 1980.

Recent collectors refer to this plant as a sun-loving shrub or large tree, 3--40 m. tall, almost leafless when in anthesis, the trunk somewhat fluted, the bark somewhat striate vertically, the flower-buds lilac, and the [immature] fruit green, and have found it growing at 380 m. altitude, flowering and fruiting in October, in anthesis also in November. The corollas are said to have been "whitish" on Araujo & Maciel 4033.

Additional citations: PERU: Madre de D^{os}: Gentry, Aronson, & Ram^{irez} 26800 (Id). Tumbes: Schunke Vigo 2413 (W--2865776). BRAZIL: Par^a: Silva & Ros^{ario} 3828 (N). Rio de Janeiro: Araujo & Maciel 4033 (Fe--17881).

VITEX DEGENERIANA Mold.

Additional bibliography: Mold., Phytologia 44: 412. 1979; Mold., Phytol. Mem. 2: 171 & 589. 1980.

VITEX DENTATA Klotzsch

Additional bibliography: Peters, Naturwiss. Reise Mossamb. 6 (1): 265--266. 1861; Pritz., Thes. Lit. Bot., imp. 1, 245. 1872; Stafleu, Tax. Lit. 355--356. 1967; Pritz., Thes. Lit. Bot., imp. 2, 245. 1972; Mold., Phytologia 44: 413. 1979; Mold., Phytol. Mem. 2: 241 & 589. 1980.

VITEX DINKLAGEI G^{lrke}

Additional bibliography: Mold., Phytologia 44: 413. 1979; Mold., Phytol. Mem. 2: 215 & 589. 1980.

VITEX DIVARICATA Sw.

Additional bibliography: Stahl, Estud. Fl. Puerto Rico, ed. 1, 3: 296--297 (1888) and ed. 2, 3: 296--297. 1937; Mold., Phytologia 45: 482. 1980; Mold., Phytol. Mem. 2: 94, 96, 98, 99, 101, 103, 104, 112, 121, 366, 457, 459, 460, & 589. 1980.

Howard describes this plant as a tree, 20 feet tall, the trunk 5 inches in diameter at breast height, the immature fruit green in August.

The Null & Scully 130, distributed as *V. divaricata*, actually is *V. parviflora* A. L. Juss.

Additional citations: PUERTO RICO: Howard 16646 (W--2891989).

VITEX DONIANA Sweet

Additional & emended bibliography: G. Don in Sweet, Hort. Brit., ed. 3, 551. 1839; R. E. Fries, Wiss. Ergebn. Schwed. Rhodes.-Kong. Exped. Bot. 2 (2): 273--274. 1916; Mold., Phytologia 45: 482--483, 486, & 487 (1980) and 46: 22 & 30. 1980; Mold., Phytol. Mem. 2: 91, 200--202, 205--207, 209--213, 215--217, 221, 223, 224, 228, 229, 231, 234, 236, 239, 241, 247, 251, 366, 369, 457, & 589--590. 1980.

Fries (1916) notes that this is a "Bis 15 m hoher Baum, etwas an *Aesculus* erinnernd. Die neuen Blätter waren beim Einsammeln (d/ 20. Sept.) gerade ausgewachsen, die der vorigen Vegetationsperiode abgefallen. Die Blüten waren noch nicht völlig entwickelt, die Infloreszenzen jedoch ausgewachsen....Bei Bwana Mkubwa in Nordwest-Rhodesia wurde eine an *V. Cienkowskii* erinnernde, wahrscheinlich unbeschriebene Art gefunden (n. 447). Das Material war ziemlich unvollständig, da Blüten fehlten. Ende August trug nämlich die Pflanze nur die pflaumenähnlichen schwarzen Früchte. Die Blätter waren 3- oder gewöhnlich 5-zählig, die Blättchen gestielt, kahl, umgekehrt eiförmig und durch eine abgesetzte kurze Spitze besonders charakterisiert."

Additional citations: SIERRA LEONE: *G. Don s.n.* [Mo. Bot. Gard. photo A.851] (Go--photo of type, Z--photo of type).

VITEX EXCELSA Mold.

Additional bibliography: Mold., *Phytologia* 45: 483. 1980; Mold., *Phytol. Mem.* 2: 136, 171, & 590. 1980.

Recent collectors describe this species as a tree, 5 m. tall, the leaves pilose, and the immature fruit green and velutinous, and have found it in fruit in December. Material has been misidentified and distributed in some herbaria as *V. flavens* H.B.K.

Additional citations: BRAZIL: Pará: *Vilhena, Lobo, & Ribeiro* 176 (N).

VITEX FLAVENS H.B.K.

Additional bibliography: Mold., *Phytologia* 45: 483. 1980; Mold., *Phytol. Mem.* 2: 84, 112, 130, 136, 171, & 590. 1980.

The *Vilhena, Lobo, & Ribeiro* 176, distributed as *V. flavens*, actually is *V. excelsa* Mold.

VITEX GAMOSEPALA W. Griff.

Additional & emended bibliography: E. D. Merr., *Bibl. Enum. Born.* Pl. 5: 514. 1921; Fletcher, *Kew Bull. Misc. Inf.* 1938: 405, 407, 432, & 436--437. 1938; Mold., *Phytologia* 44: 486--488 (1979) and 46: 483. 1980; Mold., *Phytol. Mem.* 2: 287, 297, 319, 458, 460, & 590. 1980.

Fletcher (1938) cites only *Kerr* 440 and *Lakshnakara* 695 from Thailand, asserting that the type of the species was collected in Malacca and that the species occurs also in Borneo and Sumatra.

VITEX GAUMERI Greenm.

Additional bibliography: Mold., *Phytologia* 44: 489--492. 1979; Mold., *Phytol. Mem.* 2: 69, 73, 75, 77, 80, 366, 458, & 590. 1980; Seymour, *Phytol. Mem.* 1: 246. 1980.

Recent collectors describe this plant as an abundant tree, 15 m. tall, with fragrant flowers, and have found it growing along roadsides, in gallery forests, and among metamorphic rocks on river floodplains, at 300--820 m. altitude, flowering in July, and fruiting in August. The corollas are said to have been "blue-purple" on *Stevens* 9324 and "violet" on *Calzada* 2317. *Calzada* reports the vernacular name variant, "ya-axnik".

The *Blanco, Toledo, & Cabrera 530*, distributed as *V. gaumeri*, actually is *V. pyramidata* B. L. Robinson.

Additional citations: MEXICO: Tabasco: *Calzada 2317* (Me--270117). Yucatán: *Butterwick 287* (Ld), *297* (Ld). NICARAGUA: Boaco: *W. D. Stevens 9324* (Ld). Estelí: *W. D. Stevens 9943* (Ld). Nueva Segovia: *W. D. Stevens 3352* (Z).

VITEX GIGANTEA H.B.K.

Additional & emended bibliography: G. Don in Sweet, Hort. Brit., ed. 3, 551. 1839; Mold., Phytologia 45: 483. 1980; Mold., Phytol. Mem. 2: 130, 136, 366, 458, & 590. 1980.

Dodson and his associates describe this species as a tree, 15 m. tall, the corollas "dark-blue with a white throat" and found it in anthesis in October.

Additional citations: ECUADOR: El Oro: *Escobar 804* (Au). Los Ríos: *Dodson, Gentry, & Valverde 8754* (N). Tumbes: *Vargas Alvarez 1* (W--2865959), *32* (W--2865960).

VITEX GLABRATA R. Br.

Additional & emended bibliography: Fletcher, Kew Bull. Misc. Inf. 1938: 405, 432, & 435--436. 1938; Fosberg, Sachet, & Oliver, Micronesica 15: 239. 1979; Fosberg, Otobed, Sachet, Oliver, Powell, & Canfield, Vasc. Pl. Palau 38. 1980; Mold., Phytologia 45: 483--484 (1980), 46: 483 (1980), and 47: 21. 1980; Mold., Phytol. Mem. 2: 24, 266, 271, 274, 287, 289, 290, 294, 297, 309, 310, 319, 321, 323, 328, 339, 366, 457--460, & 590. 1980.

Recent collectors have found this plant growing in scrub on riverbanks, in scrub jungles, mixed deciduous forests, evergreen and dry evergreen forests, the edges of evergreen forests, and hedgerows. from 2--330 m. altitude, in fruit in March. Lazerides found it "occasional in black alluvial soil with *Eucalyptus papuana*, *Brachyachne convergens*, *Terminalia*, and *Hakea arborescens*.

Fletcher (1938) cites from Thailand the following collections: *Collins 165 & 1217*, *Kerr 3369, 4391, 6031, 6156, 7748, 15211, 15370, 17103, & 19121*, *Lakshnakara 960*, *Noe 202*, *Put 1612*, *Rabil 383*, and *Vanpruk 725*; also *Marcan 1722 & 2086* probably cultivated. He notes that the type of the species is from Northern Australia, but lists the species also from Indochina, Malaya, and New Guinea. He includes "*V. leucoxydon* Linn." in the sense as used by Kurz, in its synonymy.

Additional citations: NEW GUINEA: West Irian: *Schram BW.7986* (Me--264199). AUSTRALIA: Northern Territory: *Lazerides 7986* (W--2910882).

VITEX GRANDIFOLIA Gürke

Additional bibliography: Mold., Phytologia 45: 485--487 (1980) and 46: 40. 1980; Mold., Phytol. Mem. 2: 207, 209--211, 213, 215, 216, 366, & 590. 1980.

According to a note appended to the label accompanying the collection, seed was gathered from the *Baldwin 14818* collection in Liberia to be grown at Williamsburg, Virginia.

Additional citations: LIBERIA: *Baldwin 14818* (W--2070224).

VITEX GRISEA J. G. Baker

Additional bibliography: Mold., *Phytologia* 45: 487--488. 1980; Mold., *Phytol. Mem.* 2: 228, 234, & 590. 1980.

Additional citations: ANGOLA: Huila: *Welwitsch* 5759 [Mo. Bot. Gard. photo 2997] (Go--photo of type).

VITEX GUERKEANA Hiern

Additional bibliography: Mold., *Phytologia* 45: 488. 1980; Mold., *Phytol. Mem.* 2: 234 & 590. 1980.

Additional citations: ANGOLA: Cuanza Norte: *Welwitsch* 5632 [Mo. Bot. Gard. photo 2995] (Go--photo of type).

VITEX HAVILANDII Ridl.

Additional bibliography: Mold., *Phytologia* 45: 490 (1980) and 47: 31 & 39. 1980; Mold., *Phytol. Mem.* 2: 319 & 590. 1980.

VITEX HAYNGA Roxb.

Additional & emended bibliography: Roxb., *Hort. Beng.*, imp. 1, 46 (1814) and imp. 2, 46. 1980; Mold., *Phytologia* 45: 490. 1980; Mold., *Phytol. Mem.* 2: 266, 366, & 590. 1980.

VITEX HEMSLEYI Briq.

Additional bibliography: Mold., *Phytologia* 45: 490--491 (1980) and 46: 11. 1980; Mold., *Phytol. Mem.* 2: 69, 80, & 590. 1980.

Vincelli describes this plant as a shrub, 3 m. tall, and found it growing along a river in mangrove swamps, at altitudes of sea-level to 10 m., in flower in June. The corollas on his collection (cited below) are described as having been "violet" in color when fresh.

Additional citations: MEXICO: Jalisco: *A. Pérez* 1846 (Me--270080). NICARAGUA: Zelaya: *Vincelli* 669 (Z).

VITEX KLUGII Mold.

Additional bibliography: Mold., *Phytologia* 45: 495. 1980; Mold., *Phytol. Mem.* 2: 112, 121, 136, 171, & 591. 1980.

Recent collectors refer to this species as a slender tree, 10--20 m. tall, the trunk 3 inches in diameter at breast height, and the fruit blackish. They have found it growing in upland white sand and mostly in white sand in non-inundated forests (*terra firme*), at 140 m. altitude, flowering and fruiting in March. The corollas are said to have been "blue" on *Gentry & al.* 26134.

Additional citations: PERU: Loreto: *Gentry, Díaz, Aronson, & Jaramillo* 25873 (Ld), 26134 (Z).

VITEX KUYLENII Standl.

Additional bibliography: Mold., *Phytologia* 46: 10--11. 1980; Mold., *Phytol. Mem.* 2: 69, 73, 75, 77, 80, & 591. 1980; Seymour, *Phytol. Mem.* 1: 246. 1980.

Recent collectors describe this plant as a tree, 8--11 m. tall, and have encountered it in thickly wooded ravines with brooks on pine savannas, at 10--20 m. altitude, in flower in August, and in fruit in June. The corollas are said to have been "blue" on *Dwyer*

12842.

Additional citations: GUATEMALA: Izabal: *Jones & Facey 3500* (Me--116923); *Jones, Proctor, & Facey 3031* (Me--116924). BELIZE: *Dwyer 12842* (Ws). NICARAGUA: Zelaya: *Vincelli 545* (Z).

VITEX KWEICHOWENSIS P'ei

Additional bibliography: Chun, *Sinensia* 4: 268. 1940; Mold., *Phytologia* 46: 11. 1980; Mold., *Phytol. Mem.* 2: 280 & 591. 1980.

VITEX LANIGERA Schau.

Additional bibliography: Mold., *Phytologia* 46: 11--12. 1980; Mold., *Phytol. Mem.* 2: 252, 458, & 591. 1980.

Gentry encountered this species in cloud-forests and forest remnants in ravines, at 2500 m. altitude, fruiting in May, and describes it as a tree, 8--10 m. tall, the fruit at first green, then brown.

Additional citations: MADAGASCAR: A. *Gentry 11640* (E--2737772), *11815* (E--2737593); *Hilsenberg & Bojer s.n.* [Mo. Bot. Gard. photo A.862] (Go--photo, Z--photo).

VITEX LEUCOXYLON L. f.

Additional & emended bibliography: Roxb., *Hort. Beng.*, imp. 1, 46. 1814; Roxb., *Fl. Ind.*, ed. 2, imp. 1, 74--75 (1832) and ed. 2, imp. 2, 483. 1874; Brandis, *Forest Fl. N-W. Cent. India* 370. 1874; Funke, *Ann. Jard. Bot. Buitenz.* 41: 55. 1930; Roxb., *Fl. Ind.*, ed. 2, imp. 3, 483. 1971; Hocking, *Excerpt. Bot. A.23*: 389. 1974; Mold., *Phytologia* 46: 12--20 & 41. 1980; Mold., *Phytol. Mem.* 2: 256, 266, 269, 274, 297, 319, 366, 458, 460, & 591. 1980; Roxb., *Hort. Beng.*, imp. 2, 46. 1980.

Additional citations: SRI LANKA: *Meijer & Jayasuriya 1314* (W--2867464).

VITEX LEUCOXYLON f. *SALIGNA* (Roxb.) Mold.

Emended synonymy: *Vitex saligna* Roxb., *Hort. Beng.*, imp. 1, 46. 1814; *Fl. Ind.*, ed. 2, imp. 1, 3: 75. 1832.

Additional & emended bibliography: Roxb., *Hort. Beng.*, imp. 1, 46. 1814; Roxb., *Fl. Ind.*, ed. 2, imp. 1, 3: 75 (1832) and ed. 2, imp. 2, 483. 1874; D. H. Scott in *Solered.*, *Syst. Anat. Dicot.* [transl. Boodle & Fritsch] 1: 634. 1908; Mold., *Phytologia* 46: 17--19. 1980; Mold., *Phytol. Mem.* 2: 266, 366, 460, & 591. 1980; Roxb., *Hort. Beng.*, imp. 2, 46. 1980.

VITEX LEUCOXYLON f. *ZEYLANICA* (Mold.) Mold.

Additional bibliography: Hocking, *Excerpt. Bot. A.23*: 389. 1974; Mold., *Phytologia* 46: 17 & 19--20. 1980; Mold., *Phytol. Mem.* 2: 266, 269, 458, & 591. 1980.

VITEX LIMONIFOLIA Wall.

Additional & emended bibliography: Fletcher, *Kew Bull. Misc. Inf.*: 1938: 405, 431, & 433. 1938; Mold., *Phytologia* 46: 20--21. 1980; Mold., *Phytol. Mem.* 2: 266, 274, 287, 289, 290, 366, & 591. 1980.

Recent collectors have encountered this plant in open woods and open deciduous forests, at 15--300 m. altitude. Mrs. Collins reports that in Thailand its wood is used to make house-posts.

Fletcher (1938) notes that the nomenclatural type of the species is from the Prome hills of Burma, lists the species also from Laos and Cambodia, and cites *Ollins 9*, *Kerr 2011 & 19488*, *Kiah 24414*, *Marcan 367 & 1102*, and *Vanpruk 184 & 1009* from Thailand.

VITEX LINDENI Hook. f.

Additional & emended bibliography: Bean in Chittenden, *Dict. Gard.*, imp. 1, 4: 2249 (1956) and imp. 2, 4: 2249. 1965; Mold., *Phytologia* 46: 21. 1980; Mold., *Phytol. Mem.* 2: 366 & 591. 1980.

VITEX LONGISEPALA King & Gamble

Additional & emended bibliography: Fletcher, *Kew Bull. Misc. Inf.* 1938: 405, 407, 432, & 436. 1938; Mold., *Phytologia* 46: 22. 1980; Mold., *Phytol. Mem.* 2: 287, 298, & 591. 1980.

Recent collectors refer to this plant as a scandent shrub and have encountered it in evergreen forests, at 100--210 m. altitude. Fletcher (1938), noting that the type of the species is from the Malay Peninsula, cites only *Kerr 7113*, *Kiah 24275*, and *Lakshnara 634* from Thailand.

VITEX LUCENS T. Kirk

Additional & emended bibliography: Laing & Blackwell, *Pl. N. Zeal.*, ed. 1, 350--351 & 456, fig. 114. 1906; Cheeseman, *Man. N. Zeal. Fl.*, ed. 2, 763--764 & 1163. 1926; Laing & Blackwell, *Pl. N. Zeal.*, ed. 3, 286, 354--356, & 468, fig. 127 (1927), ed. 4, 221, 372, & 499, fig. 127 (1940), and ed. 7, 221, 371--373, & 499, fig. 139. 1964; Mold., *Phytologia* 46: 23--28. 1980; Mold., *Phytol. Mem.* 2: 340, 366, 458, & 591. 1980.

Emended illustrations: Laing & Blackwell, *Pl. N. Zeal.*, ed. 1, 351, fig. 114 (1906), ed. 3, 355, fig. 127 (1927), ed. 4, 372, fig. 139 (1940), and ed. 7, 372, fig. 139. 1964.

Hooker (1853) reports the vernacular name, "kaneree", and cites *Banks & Solander* and *Colenso s.n.* He notes that the species is "Rare in the Middle Island" and is cultivated in England.

Additional citations: NEW ZEALAND: North: *B. H. Macmillan 69/89* (Ne--33952). MOUNTED ILLUSTRATIONS: Laing & Blackwell, *Pl. N. Zeal.*, ed. 1, 351, fig. 114. 1906 (Z).

VITEX MADIENSIS var. *MILANJIENSIS* (Britten) Pieper

Additional bibliography: Mold., *Phytologia* 46: 30--31. 1980; Mold., *Phytol. Mem.* 2: 221, 223, 228, 234, 236, 239, 241, & 591. 1980.

Reekmans has encountered this plant at 1600--1800 m. altitude, flowering in February and October. The corollas are said to have been "whitish" on his no. 7211 and "white, lower lip violet" on his no. 5765

Additional citations: BURUNDI: *Reekmans 5765*(Ac), 7211 (Ac).

VITEX MEGAPOTAMICA (Spreng.) Mold.

Additional bibliography: Baill., *Hist. Pl.* 11: 94. 1891; Dombrowski & Neto, *Inform. Pesq.* 3 (21): 80 & 81. 1979; Klein, *Sellowia* 31: 163. 1979; Mold., *Phytologia* 46: 31--38. 1980; Mold., *Phytol. Mem.* 2: 171, 180, 181, 193, 366, 435, 458--460, & 592. 1980.

Dombrowski & Neto (1979) describe this species as a tree to 5 m. tall, with lilac-colored corollas, blooming in December and January, known locally as "tarumã", and used to make "obras externas, esteios, moirões, postes, carrocerias, mobílias dormentes de primeira qualidade". Renvoize describes it as a slender tree, 8--20 m. tall, the trunk smooth or the bark flaking off in vertical strips, gray, the leaves bright glossy-green above, and the corollas "grayish-white, violet in the throat" (*no.* 3204) or "white, the dorsal lobe pale-mauve, the throat with mauve streaks, pilose on the upper lip, the stamens deep-mauve" (*no.* 3259), and has encountered it growing at 175--200 m. altitude, in anthesis in October.

Additional citations: ARGENTINA: Misiones: *Renvoize* 3204 (W--2894513), 3259 (W--2894514).

VITEX MICRANTHA Glürke

Additional bibliography: Mold., *Phytologia* 46: 39. 1980; Mold., *Phytol. Mem.* 2: 209--211, 215, 458, & 592. 1980.

Bernardi describes this plant as a tree, 4--10 m. tall.

Additional citations: IVORY COAST: *Bernardi* 8456 (W--2866289).

VITEX MOLLIS H.B.K.

Additional bibliography: Mold., *Phytologia* 46: 40--43. 1980; Mold., *Phytol. Mem.* 2: 69, 366, 458, 459, & 592. 1980; Wiggins, *Fl. Baja Calif.* 525 & 535, fig. 503. 1980.

Additional illustrations: Wiggins, *Fl. Baja Calif.* 535, fig. 503. 1980.

Recent collectors describe this species as a wide-spreading tree, 12 m. tall, and have found it growing in low deciduous woods, at 430--1100 m. altitude, reporting the vernacular name, "nanche de perro". The corollas are said to have been "blue" on *Boutin & Brandt* 2666.

Additional citations: MEXICO: Guerrero: *Blanco, Toledo, & Cabrera* 538 (Me--276341). Jalisco: *Boutin & Brandt* 2666 (Me--270698). Michoacán: *Eggleter* 166 (Ws).

VITEX MOMBASSAE Vatke

Additional & emended bibliography: J. B. Baker in *Thiselt.-Dyer*, *Fl. Trop. Afr.* 5: 316, 321, 326, & 521. 1900; R. E. Fries, *Wiss. Ergebn. Schwed. Rhodes.-Kong. Exped. Bot.* 2 (2): 273. 1916; Fedde & Schust., *Justs Bot. Jahresber.* 42: 252. 1920; Good & Exell, *Journ. Bot.* 68: Suppl. 144. 1930; Fedde & Schust., *Justs Bot. Jahresber.* 57 (2): 403. 1938; Moomaw, *Study Pl. Ecol. Coast Kenya* 41. 1960; Dale & Greenway, *Kenya Trees Shrubs* 593 & 597. 1961; Friedrich-Holzhammer, Meewe, & Meikle, *Prodr. Fl. Südw. Afr.* 13, 122: 10. 1967; Astle, *Kirkia* 7: 92. 1968; Mold.,

Phytologia 17: 12. 1968; Richards & Morony, Check List Fl. Mbala 239--240. 1969; Gillett, Numb. Check-list Trees Kenya 47. 1970; Mold., Fifth Summ. 1: 232, 238, 240, 242, 245, 247, 249, 250, & 253 (1971) and 2: 717, 718, 722, 727, & 927. 1971; Greenway & Vesey-Fitzgerald, Journ. E. Afr. Nat. Hist. Soc. Nat. Mus. 28: 21. 1972; Palmer & Pitman, Trees South. Afr., ed. 2, 3: 1950, 1951, & 1957. 1972; Mold., Phytologia 34: 262. 1976; Lawton, Journ. Ecol. 66: 183. 1978; Mold., Phytologia 44: 390. 1979; Mold., Phytol. Mem. 2: 221, 228, 230, 231, 235, 236, 238, 239, 242, 243, & 592. 1980.

Lawton (1978) lists this species as a member of the *chipya* ecological group of species growing in an open habitat where dry season fires are intense. Palmer & Pitman (1972) assert that it is, along with *V. amboniensis* Gürke and *V. harveyana* H. H. W. Pearson, a species which grows well in northeastern Namibia. They describe it as a shrub or tree of savannas and open forests, partial to sandy soil, to 6 m. tall, often many-branched from the base, with smooth gray bark and hairy young twigs, having long-petiolate leaves composed of 3--5 leaflets which are slightly hairy above, densely velutinous beneath, marginally dentate or entire, and sessile or subsessile, the central one to 7.5 cm. long and 1.9 cm. wide, "egg-shaped, oval, or oblong", apically rounded or "pointed". The flowers are described as borne in cymes on long stalks [peduncles] in the axils of the leaves, the corollas mauve, violet, or bicolored, the fruit "about the size of a cherry", with a "hard stone and a thin, fleshy covering", black when mature, and edible. They report the common name, "wild cherry".

Greenway & Vesey-Fitzgerald (1972) refer to the species as a small tree of rocky hillsides, fire subclimax, and open woodland in Lake Manyara National Park, citing their no. 6001. Astle (1968) cites his no. 283 from Zambia. Friedrich-Holzhammer and his associates (1967) cite *DeWinter & Marais 4796* and *Watt 17* from Namibia. Apparently they accept *V. flavescens* Rolfe as distinct from *V. mombassae*.

Richards & Morony (1969) found *V. mombassae* to be a "fairly large spreading tree", 20 feet tall, growing in open, very rocky, sandy areas, on rough stony slopes, steep roadsides, and among flat laterite rocks, at 2600--5800 feet altitude, citing their nos. 2309, 11846, 11914, 13300, 13574, & 18169 and *Robertson 180* from Mbala.

Watts & Breyer-Brandwijk (1962) report that the sap of this tree "is caustic and may on occasion cause severe swelling and pain, but is applied by native boys in Zambia 'to make the penis grow bigger'. In Tanzania a decoction of the plant is used for 'strengthening and flavouring tobacco.'" They also report the fruit is edible and list the following vernacular names: "kashilumbulu", "mfulu", "mfuru", "mfutu", "mkakata", "mkinka", "mpura", "msungwa", "msungwe", "msungwi", "mtalali", "mubonya", "muchunkule", "muhunda", "mumbomba", "mumbomba-wacilunga", "muninka", "umchunkale", and "umtshonge".

Dale & Greenway (1961) describe the species as a "small savanna tree to 20 ft. with densely pubescent branchlets. Leaves coriaceous

and 3--5-foliolate with petiole 1/2 to 4 in. long. Leaflets ovate, elliptic or oblong-elliptic to 3 in. long and 1 3/4 in. broad, apex rounded to acute or shortly cuspidate, entire and sessile or very shortly petiolulate, lamina thinly pubescent above and densely so beneath. Flowers in few-flowered axillary cymes on peduncles 2 1/2 in. long; bracts lanceolate or oblanceolate. Corolla twice as long as the calyx, white with one mauve lobe or all mauve. Ovary hairy. Drupes black, the size of a plum." They describe it as a resident of coastal savannas in Kenya, citing *Drummond & Hemsley 1156, Gardner 1464, and Hildebrandt 1872* (the type). They record the vernacular names: "mfududu", "mfudumaji", "mfudukoma", "mkalijote", and "mkufu".

Moomaw (1960) encountered the tree in wooded portions of savannas in coastal Kenya. Good & Exell (1930) refer to it as a shrub or tree 10--25 feet tall growing in thickets especially comprised of *Combretaceae* (*Combretum*, *Diplorhynchus*, etc.) and "sporadic in open forests of *Combretum*" in Angola, citing their nos. 1052, 1053, 1063, and 1064, listing "muxiluxillu" as a vernacular name.

Fries (1916) calls the species a "Niedriger Baum oder Strauch in den Trockenwäldern [in Zambia]. Ende September in beginnender Blüte; der grösste Lappen der Blütenkrone blau, die vier kleineren nellblau. -- Die Art ist bisher aus Angola und dem unteren Kongo angegeben", citing his no. 832. Gürke (1895) calls it a shrub to 4 m. tall, inhabiting the "Buschsteppe" of East Africa.

Recent collectors refer to *Vitex mombassae* as a hairy shrub, shrublet, or small tree, 2--8 m. tall, single-stemmed, much branched, the trunk to 12 inches in diameter, the bark yellowish-gray and smooth or corrugated, the sap colorless, the leaves tomentose, the flowers small, aromatic, paniced, and the immature fruit large, green [the 12-inch trunk diameter seems questionable -- probably "in circumference" was intended]. They have found it growing in deep coarse sand, red sandy soil, or orange-brown sandy loam in sandy thickets, open woods, *Brachystegia* woodland, and grassveld, as well as in stony ground in the bush, at 50--1970 m. altitude, in anthesis from September to December, as well as in March and May, and in fruit in February and June. It is reported "local with *Schrebera koiloneura* and *Combretum purpureiflorum* in woodland of *Commiphora ugogensis*, *C. molle*, *C. mossambicensis*, *Combretum apiculatum*, *Strophanthus eminii*, *Xeroderris stuhlmannii*, *Grewia* spp., *Markhamia* spp., *Euphorbia matabelensis*, *Dalbergia aberrans*, *Entandrophragma bussei*, and *Sesamothamnus busseanus*.

The corollas are said to have been "mauve" on *Tanner 2523*, "purple & mauve" on *Tanner 1245*, "mauve & white" on *Tanner 2826*, "light blue-lilac" on *Schlieben 5353*, "white to light-blue" on *Mwasumbi 10292*, and "hood & sides of lobes white, lip light-mauve" on *Greenway & Kanuri 14688*.

"Chella" is the name applied to this plant by the Bushmen, according to Watt, who, strangely, refers to the fruit as "inedible". Collectors also report the local name, "mushembere", from Namibia

and, from Tanzania, the names, "mfuu mwengere", "mutalali", and "sungwi".

Richards describes the leaves as "5-lobed. soft, but they are compound, not simple and lobed, although the leaflets may be sessile or subsessile). Greenway & Kanuri call the "leaves peltate", but this, also, is not true.

According to Tanner, in Tanzania the species is found in cultivated areas as a residual tree, left standing because of its edible fruit. He also asserts that the pounded roots are used in the treatment of snakebite to cause vomiting, also mixed with butter placed in cuts on the temples "and to close the fontanelle on newly born infants".

Vitex mombassae is easily confused with *V. payos* (Lour.) Merr., but may be distinguished from the latter by its much larger flowers and the pubescence in the inflorescence being yellowish-brown instead of white.

Material of *V. mombassae* has been misidentified and distributed in some herbaria as *V. amboniensis* Gürke, *V. shirensis* J. G. Baker, and even as *Torenia mannii* Skan. On the other hand, the *Harris 2827* and *Lemboko 26*, distributed as *V. mombassae*, actually are *V. payos* var. *glabrescens* (Pieper) Mold. and *Holst 2096* is *Premna chrysocarpa* (Bojer) Gürke.

Additional citations: TANZANIA: *Carnochan 69* (W--2091735); *Greenway & Kanuri 14688* (Mu); *Mwasumbi 10292* (Ld); *Pole-Evans 778* (W--1940928); *Schlieben 1477* (Mu), *5353* (Mu); *Tanner 1245* (N), *2523* (N), *2826* (Ba, N). ZAMBIA: *Gilges 671* (Mu); *M. Richards 21442* (E--1836521); *E. A. Robinson 3786* (Mu), *3940* (Mu). ZIMBABWE: *G. M. McGregor 72/51* [Govt. Herb. 34662] (N). MALAWI: *J. Buchanan 231* (W--806745). NAMIBIA: *Baum 298* (Mu--3914); *Winter & Marais 4796* (Mu). LOCALITY OF COLLECTION UNDETERMINED: *Watt 17* [W. Caprivi] (Mu).

VITEX MOMBASSAE var. ACUMINATA Pieper

Additional bibliography: Fedde & Schust., *Justs Bot. Jahresber.* 57 (2): 403. 1938; Dale & Greenway, *Kenya Trees Shrubs* 597. 1961; Mold., *Phytologia* 15: 267. 1967; Mold., *Fifth Summ.* 1: 242 (1971) and 2: 927. 1971; Mold., *Phytol. Mem.* 2: 231 & 592. 1980.

VITEX MOMBASSAE var. ERYTHROCARPA (Gürke) Pieper

Additional bibliography: Fedde & Schust., *Justs Bot. Jahresber.* 57 (2): 403. 1938; Mold., *Phytologia* 15: 267. 1967; Mold., *Fifth Summ.* 1: 247 (1971) and 2: 717 & 927. 1971; Mold., *Phytologia* 25: 416. 1973; Mold., *Phytol. Mem.* 2: 236 & 592. 1980.

VITEX MOMBASSAE var. PARVIFLORA (Gibbs) Pieper

Additional bibliography: Mold., *Phytologia* 15: 267. 1967; Mold., *Fifth Summ.* 1: 249 (1971) and 2: 717, 722, & 927. 1971; Mold., *Phytol. Mem.* 2: 238 & 592. 1980.

Additional citations: ZIMBABWE: *Gibbs 135* [Mo. Bot. Gard. photo A.855] (Go--photo of type, N--photo of type, W--photo of type, Z--photo of type).

VITEX MORONENSIS Mold., *Phytologia* 34: 246. 1976.

Bibliography: Mold., *Phytologia* 34: 246 & 257. 1976; López-Palacios, *Revist. Fac. Farm. Univ. Andes* 20: 33. 1979; Mold., *Phytologia* 44: 398. 1979; Mold., *Phytol. Mem.* 2: 130 & 592. 1980.

Citations: ECUADOR: Morona Santiago: *Little, Ortega U., Samaniego V., & Vivar C.* 548 (Z--type).

VITEX MOSSAMBICENSIS Gürke

Synonymy: *Vitex mossamicensis* Pieper ex Mold., *Résumé* 387, *sphalm.* 1959.

Additional & emended bibliography: J. G. Baker in *Thiselt.-Dyer, Fl. Trop. Afr.* 5: 317 & 329. 1900; Fedde & Schust., *Justs Bot. Jahresber.* 57 (2): 402. 1938; Mold., *Résumé* 145, 151, 387, & 477. 1959; Mold., *Phytologia* 15: 267. 1967; Mold., *Fifth Summ.* 1: 239 & 253 (1971) and 2: 927 & 973. 1971; Mold., *Phytologia* 44: 393. 1979; Mold., *Phytol. Mem.* 2: 228, 242, 459, & 592. 1980.

Gürke (1895) notes that "Siese Art fällt besonders auf durch die an der Unterseite in den Winkeln der Adern gebärteten Bl[ätter] und die stark lippenförmige, mit kurzem, breitem Tubus versehene B[lutenkrone]."

Baker (1900) cites only the type collection from Mozambique. Recent collectors describe the plant as a tall tree, 3--16 m. tall, with tomentose 5-digitate leaves on long hairy petioles, the petiolules 9--10 mm. long, axillary, subterminal, lax panicles, "fused sepals", and long-"pedicellate" fruit "with a slight smell", and have encountered it scattered in dense coastal thickets, at 90--280 m. altitude, in fruit in January. The corollas are said to have been "steel-blue" on *Schlieben* 5792.

Material of *V. mossambicensis* has been misidentified and distributed in some herbaria as *V. buchananii* J. G. Baker.

Additional citations: TANZANIA: Tanganyika: *B. J. Harris* 6180 (Z); *Ludanga MRC.1180* (Tz); *Schlieben* 5792 (Mu).

VITEX MOSSAMBICENSIS var. *OLIGANTHA* (J. G. Baker) Pieper

Additional synonymy: *Vitex mossamicensis* var. *oligantha* (J. G. Baker) Pieper ex Mold., *Résumé* 387, *sphalm.* 1959.

Additional bibliography: Fedde & Schust., *Justs Bot. Jahresber.* 57 (2): 402. 1938; Mold., *Phytologia* 15: 267. 1967; Mold., *Fifth Summ.* 1: 239 (1971) and 2: 722, 724, 927, & 973. 1971; Mold., *Phytol. Mem.* 2: 228, 459, & 592. 1980.

VITEX NEGUNDO L.

Additional & emended synonymy: *Negundo arbor mas* J. Bauhin, *Hist. Pl. Univers.* 2: 189. 1651. *Negundo arbor femina* J. Bauhin, *Hist. Pl. Univers.* 2: 189. 1651. *Vitex trifolia odorata, sylvestris indica* P. Herm. ex Breyné, *Prod. Fasc. Rar. Pl.*, ed. 1, 2: 106, in syn. 1688. *Vitex trifolia minor indica serrata* Breyné, *Prod. Fasc. Rar. Pl.*, ed. 1, 2: 106. 1688. *Vitex trifolia odorata silvestris indica* P. Herm., *Mus. Zeyl.*, ed. 2, 47. 1726. *Vitex trifolia major* Rauwolf ex P. Herm., *Mus. Zeyl.*, ed. 2, 47. 1726. *Walnika* P. Herm., *Mus. Zeyl.*, ed. 2, 47. 1726. *Negundo prior, sive mas; Acostae* Breyné, *Prod. Fasc. Rar. Pl.*, ed. 2, 2:

106, in syn. 1739. *Lagondium litoreum* Rumpf, Herb. Amboin. 4: 50, pl. 19. 1743. *Negundo femina* Acosta ex L., Fl. Zeyl., imp. 1, 194. 1747. *Vitex trifolia odorata sylvestris indica* Burm. ex L., Fl. Zeyl., imp. 1, 194. 1747. *Negundo mas* Acosta ex L., Fl. Zeyl., imp. 1, 195. 1747. *Vitex foliis quinatis ternatisque serratis, floribus racemoso-paniculatis* L. ex P. Browne in Sloane, Civil Nat. Hist. Jamaic., ed. 1, 267, in syn. 1756. *Vitex trifolia indica minor serrata* Pluk. ex Burm. f., Fl. Ind. 138, in syn. 1768. *Vitex trifolia sylvestris indica odorata* Burm. f., Fl. Ind. 138, in syn. 1768. *Lagondium littoreum* Rumpf apud Burm. f., Fl. Ind. 138, in syn. 1768. *Vitex foliis quinatis, ternatisque serratis, floribus racemoso-paniculatis* L. apud Burm. f., Fl. Ind. 138. 1768. *Bem-noss* Rheede apud Decne., Nouv. Ann. Mus. Hist. Nat. Paris 3: 400, in syn. 1834. *Vitex leucoxylon* Blanco, Fl. Filip., ed. 1, 516. 1837. *Vitex trifoliata odorata sylvestris indica* Burm. apud Decne., Nouv. Ann. Mus. Hist. Nat. Paris 3: 400, in syn. 1834. *Vitex negundo* Roxb. ex Buek, Gen. Spec. Syn. Candoll. 3: 502, in syn. 1858. *Lagundi* Mercado ex Fern.-Villar in Blanco, Fl. Filip., ed. 3, 4: 160, in syn. 1880. *Vitex uegundo* L. ex Razi, Journ. Univ. Poona 1 (2): Biol. 47, sphalm. 1952. *Vitex negungo* Hyland, U. S. Dept. Agr. Pl. Invent. 173: 272, sphalm. 1969. *Vitex nugundo* L. ex Tilak & Kale, Sydowia Ann. Mycol. 23: 17, sphalm. 1969. *Vitex negundo* var. *negundo* [L.] apud Encke & Buchheim in Zander, Handwörterb. Pfl.-namen, ed. 10, 525. 1972. *Vitex negundo* L. ex Vohora, Khan, & Afaq, Indian Journ. Pharm. 35: 100 & 101, sphalm. 1973. *Vito negundo* Humar, Hindustani Times Feb. 17, p. 4, sphalm. 1974. *Nika silvestris* P. Herm. ex Mold., Phytologia 31: 403, in syn. 1975. *Vitex nigundo* Patunkar, Grasses Marathwada 297, sphalm. 1980.

Additional & emended bibliography: Rheede, Hort. Ind. Malab. 2: pl. 12. 1685; Breynia, Prod. Fasc. Rar. Pl., ed. 1. 2: 106. 1688; P. Herm., Mus. Zeyl., ed. 1, 47 (1717) and ed. 2, 47. 1726; J. Burm., Thes. Zeyl. 229. 1737; Breynia, Prod. Fasc. Rar. Pl., ed. 2, 2: 106. 1739; L., Fl. Zeyl., imp. 1, 194--195 (1747) and imp. 2, 194--195. 1748; L., Sp. Pl., ed. 1, imp. 1, 2: 638. 1753; L. in Stickm., Herb. Amb. 15. 1754; P. Browne in Sloane, Civil Nat. Hist. Jamaic., ed. 1, 267. 1756; Kwa-wi [transl. Savatier], Arbor. 4: pl. 1. 1759; L., Amoen. Acad. 4: 126. 1759; L., Syst. Nat., ed. 10 [Stockh.], 2: 1122. 1759; Sandmark in L., Amoen. Acad. 5: 380. 1759; N. L. Burm., Fl. Ind. 138. 1768; J. Burm., Fl. Malab. 3. 1769; [Retz.], Nom. Bot. 156. 1772; P. Browne in Sloan, Civil Nat. Hist. Jamaic., ed. 2, 267. 1789; Rausch., Nom. Bot., ed. 3, 182. 1797; McDonald, Dict. Pract. Gard. 2: pl. 60. 1807; Willd., Enum. Hort. Berol. 660. 1809; Roxb., Hort. Beng., imp. 1, 46 & 95. 1814; Wall. in Roxb., Fl. Ind., ed. 1, imp. 1, 1: 481. 1820; Moon, Cat. Indig. Exot. Pl. Ceyl. 1: 46. 1824; A. Rich. [transl. G. Kunze], Med. Bot. 1: 383. 1824; Roxb., Fl. Ind., ed. 1, imp. 1, 3: 70 & 71. 1824; A. Rich. [transl. G. Kunze], Med. Bot. 2: 1302. 1826; Sweet, Hort. Brit., ed. 1, 1: 323. 1826; Loud., Hort. Brit., ed. 1, 246. 1830; Sweet, Hort. Brit., ed. 2, 416. 1830; Bischoff, Grundr. Med. Bot. 305. 1831; Wall., Numer. List 86, no. 1744. 1831; Cham., Linnaea 7: 107--108 & 400. 1832; G. Don in Loud., Hort. Brit., ed.

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Sweet (1826, 1830) and Loudon (1832) state that this species was introduced into cultivation in England from the "East Indies" in 1759, but Don (1839) gives the date as 1812; Bean (1956) asserts that it has been in cultivation in England since 1697.

Meyer (1976) informs us that seeds of *Vitex negundo* were sent from northern China by Pierre d'Incarville (1706--1757) to Prof. Krasheninikow in Leningrad and to Bernard de Jussieu in Paris and that the species was "previously unknown in Europe". Fletcher (1972) claims that it was introduced into cultivation from China "about 1697".

Common and vernacular names recently reported for the species include "aggia-chita", "agnocasto", "ai toeban", "ash-leaved chaste-tree", "baimat", "bana", "ban-muichi", "begunia", "cardenillo", "chaste tree", "Chinese chaste tree", "ching tau", "ch'u", "gattilier", "helarika", "hing-rain", "huang-ching", "huang chin k'otau", "Indian privet", "indrani", "indrani", "kari nagad", "katri", "lagoendi laet laki-laki", "lagunde", "lagundi", "la guum", "leban", "lenggundi", "lingur", "malawin", "man-ching", "marwan", "mâu kinh", "m-kiaⁿ-keng", "m-kiaⁿ-tê", "mewari", "midaki", "nagod", "nagoda", "nagot", "nalla nochi", "negundo", "negundo chaste-tree", "nengar", "newri", "ngũ tráo", "ngũ tráo", "nigod", "nigot", "niguti", "nika", "nike", "nikka", "nil-nika", "nirgandi", "nirgiri", "nirgud", "nirgudi", "nirgudi", "nirgund", "nirgunda", "nirgundi", "nirgur", "nirguri", "nir-nochchi", "nishinda", "nishunda", "nisinda", "nochchi", "nochi", "pasutia", "pôn-kiuⁿ-á", "po-kiuⁿ", "ran-gura", "samalu", "sambhalu", "sandbhalu", "sewain", "shawalu", "shiwa", "shiwai", "shiwáli", "shriwari", "simali", "simálu", "sinduari", "šivlingi", "siwáli", "soodoo-nikka-gass", "sudu-nika", "Taiwan-ninzinboku", "trâsé", "trasiet", "vallai-nochchi", "vavili", "ven-nochi", "vennochchi" [applied also to *Capparis zeylanica* L.], "yellow bramble", and "zuugora". Pharmaceutically it is known as "Folia vitex negundo", "Fructus Vitex negundo", and "Radix Vitex negundo".

Mallik & Chaudhuri (1968) describe the pollen of this species as "3-colpate grains, prolate, 24 μ -- 28 μ x 16 μ -- 18 μ , exine 2 μ thick, reticulate, exine thick at poles. gradually thinning towards mesocolpium, sexine thicker than nexine, colpi 19 μ in length, crassimarginate, apocolpium diameter 7 μ ." Huang (1972) describes it as "Grains prolate to subprolate; 27--32 x 20--24 μ ; amb circular-lobate" on the basis of *Mori* 22447 from Taiwan. Serbanescu-Jitarin & Mitroiu (1973) describe it as: "Polen prolat; 3-colpat; văzut apical 20,8--28,6 μ in diam., din profil înalt 20,8--46,8 μ , lat 15,6--28,6 μ . Scuturat din antere și văzut cu ochiul liber, polenul este galben-portocaliu, în apă la microscop, portocaliu, iar în chloral-hidrat galben-pal. Caractererele sporodermei sînt în general aceleași ca la polenul de *V. agnus castus*, dar suprafața sporodermei prezintă un aspect areolat datorită distribuirii veruculior așa cum se observă la *V. altissima* (Nair -- 1962). Colpi cca 4/5 din raza microsporilor, înguști și foarte ascuțiți spre poli."

It is worth noting that the Roxburgh (1814) reference given in bibliography of this species (above) is often cited by the titlepage date "1813", but Stafleu asserts that it was not published until 1814 along with the earlier part of the work. The Schnitzlein (1856) reference is often cited as "1843--1870", again the titlepage date, but the actual page involved here was issued in 1856. Buek (1858). in the index to his work, cites *Vitex negundo* Roxb. to p. 684, but I am unable to find the name on that page of the work. The Haines (1922) reference is sometimes cited to 1. 6, 1924, but the pages here involved are in vol. 4, published in 1922. The Willis (1911) reference is sometimes cited as "3: 357", but I have not been able to verify any such reference.

Prasad & Wahi (1970) discuss the macro- and microscopic characters of the whole leaf (petiole, petiolule, midrib, and lamina). The palisade cells of the lamina and cortical cells of the midrib were found to contain volatile oils and tannins. An alcoholic extract of the leaf revealed the presence of alkaloids and glycosides. Kondanda Rao and his associates (1977) found the bark to yield a fatty alcohol, beta-sitosterol, vanillic acid, p-hydroxybenzoic acid, and luteolin, and an indication of flavonoid C-glycosides.

Vohora and his associates (1974) report that an ethanolic extract from the seeds, given as an oral dose of 200 mg/kg for two days, inhibited copper acetate induced ovulation in rabbits in 60% of the animals tested.

Two new leucoanthocyanidins were isolated by Subramanian and his associates (1978) from the stem bark, their structure being that of methyl ethers of leucodelphinidin and leucocyanidin-7-O-rhamnoglucosides respectively.

Ray & Majumdar (1976) report no antimicrobial activity in the plant (exclusive of its roots). Gibbs (1974) reports the presence of vitexin, vitexin-4-L-rhamnoside, and vitexin-?-xyloside in the species and/or its varieties. Datta (1950), Madan & Nayar (1959), Sarma (1963), and Mahli & Trivedi (1972) also report that the roots and bark yield alkaloids, mishindine, a volatile

oil, and glycosides which are bitter and poisonous. The presence of an alkaloid and a volatile oil in the leaf is reported by Basu & Singh in their 1944 and 1947 works; nishindine and a volatile oil in their 1947 work. Itikawa & Yamasita (1940) report the presence of cineole, 1-sabinene, 1-a-pinene, camphene, a monohydric terpene alcohol, b-caryophyllene, a tricyclic sesquiterpene like copaene, another sesquiterpene, azulene, and a diterpene in volatile oil; Ghose & Krishna (1936) report the presence of gluconitol, p-hydroxybenzoic, 5-hydroxyisophalic, and 3,4-dihydroxybenzoic acids, and a glucoside in the leaf. Greshoff & Boorsma are reported by Heyne (1917) to have found "in den bast en da bladeren een chromogeen glucosied en.....een spoor alcaloïd."

Vitex negundo is reported to be "medicinal" by Madrid Moreno (1936), while Smith noted already in 1871 that it is "extensively used in India in native medicinal practice". My wife and I observed it frequently grown in native gardens as an ever-ready source of medicine in Sri Lanka.

In India it is asserted by Shah & Joshi (1971) that "The leaves, heated in earthen pots, are used as a fomentation in rheumatism and body swellings. A decoction, mixed with pepper, is taken for colds." Shrivastava & Sisodia (1970) report that aqueous extracts of the fruits were found to have good analgesic effects which were not antagonized by nalophine and resemble antipyretic analgesics.

Srivastava (1976) reports that in Gorak the species is "Planted in gardens as a hedge plant, also on bunds along the fields and roads. The warmed leaves are applied to rheumatic swellings and on the forehead in headache."

Patel (1971) avers that in Gujarat it "Grows in nallas and river beds. The paste of leaves is applied to skin sores. The flowers are used as medicine on [sic] diatthoëa, cholera and lever [sic] disorders." In his 1968 work he reports the "roots and leaves used in medicine and the young shoots....used for making baskets" in Melghat. Jain & Terafder (1970) list its medicinal uses in Bihar as for headaches, swelling of the head, eye inflammation, dropsy, anasarca, madness, rheumatism, hemiplegia, epilepsy, post-natal complaints, scabies, syphilis, sores, and rinderpest. Guhabakshi & Naskar (1969) tell us that in this same Indian state it is commonly used as a hedge plant. They cite *Guha Bakshi* 79.

Hyland (1969) lists *Vitex negundo* as cultivated in Maryland, citing nos. 308641, 264815 (from India), and 267709 (from Hong Kong). Coon (1967) asserts that it is taller and hardier than *V. agnus-castus* L. "and should be more widely cultivated". Bailey (1972) says that it is grown "especially for attracting bees". Brooker & Cooper (1961) reports its use for "many medicinal purposes" in Indonesia.

Cooke (1905) calls the species "A common shrub throughout the [Bombay] Presidency often cultivated in gardens and for hedges.... The leaves are agreeably aromatic when bruised and are employed in native medicine. A pillow stuffed with the leaves is placed under

the head to relieve headache. The leaves are also employed as a remedy in inflammatory swellings of the joints." He reports the plant very common along the banks of rivers and in moist situations in or near deciduous forests, abundantly planted. Burkill (1966) describes it as "A small bush, sometimes attaining 15 feet in height, but in the Malay Peninsula, apparently, always smaller, found from Africa to the Pacific; in the [Malay] Peninsula it is found in the north, and in Singapore, where perhaps it is introduced. It is similar to *V. trifolia* and used medicinally in various parts of Asia, but, as far as known, it is not used by the Malays as much as *V. trifolia*. In India and China it has a greater importance. In India the roots and leaves are regarded as a tonic and febrifuge. A decoction of the leaves, or their juice, aids in the composition of draughts for head-ache, catarrh, &c., and a pillow of the leaves may be used for head-ache...In China the fruits are much used. The Chinese in the Malay Peninsula import the dried fruits from China for use in their own prescriptions.....Rumpf recorded that roots and leaves were medicinal in his time in Amboina....Both this species and *V. trifolia* are held in high repute in the Philippine Islands for fomentations for rheumatism, beri-beri, &c."

Maheshwari (1963) states that in Delhi *V. negundo* is "Planted in gardens, lawns and along railway lines. Common on the Bangar tract on raised bunds along the roads. The warmed leaves are applied to painful and rheumatic swellings; the macerated ones are used as cooling medicine on the forehead in headache." He cites Maheshwari 118 & 689. Kumar (1974) reports from Mussoorie that it is there used in curing headaches, catarrh, fever, and for removing fetid discharges and worms from ulcers and is planted "to cover small gullies and check dams". Smiley (1960) avers that it can be used as a trimmed hedge both in direct sunlight or in semi-shade. Jafri & Ghafoor, in a personal communication to me, state that it is often planted along water channels to check erosion in Pakistan and grows readily from cuttings. There, too, "Its leaves are sometimes used for curing inflammatory swellings of joints, headache etc." They give its overall distribution as "Pakistan, India, E. Asia and N. Africa; introduced and widely cultivated elsewhere. They cite Abedin 7701, Abedin & Qaiser 8646, Ali, Faruqi, & Abedin 1957, 1958, 1959, & 1962, Ghafoor & Qaiser 297, Jafri 3845, Jafri & Ali 3493, Nasir & Ali 4573, Qaiser & Ghafoor 1191, 297, 1573, 2003, & 4495, Saida s.n., and Siddiqui & Nasir 6554, all from Pakistan.

Nairne (1894) says: "This is probably the commonest shrub in the Konkan. Very common also in the Ghats. Throughout India... The crushed leaves have a very strong and unpleasant smell, said to be equally so to insects." Troup (1921) calls it "very common, and often gregarious, throughout the greater part of India, extending into dry regions and ascending to 5,000 feet in the outer Himalaya. Abundant in open waste places, and as a hedge plant along roads and between fields. It is a useful plant for afforestation work, producing root-suckers and growing readily from cuttings. It is not usually browsed. The twigs are useful

for wattle-work and rough basket-work. Growth....7 rings per inch of radius, giving a mean annual girth increment of 0.9 in."

Williams (1949) reports that on the islands of Zanzibar, Pemba, and Panza it is found "growing wild by the seacoast...the leaves said to have some medicinal value....the soft and light wood used for laths, roofs, planks, canoe outriggers and guitars."

Rageau (1957) says that in New Caledonia it is "un arbuste des régions côtières qui passe également pour répulsif pour les insectes. Les feuilles, l'écorce et les racines sont employées contre les maux de dents, les fièvres, le rhumatisme, les ophthalmies et comme toniques, carminatives et vermifuges. Les feuilles sèches sont parfois fumées pour calmer les céphalalgies et les migraines tenaces. La racine et les fruits seraient emménagogues."

Kanjilal & al. (1939) assert that in Assam it is common throughout the country and the strongly scented twigs are used for basket-making, the leaves and roots as a tonic and febrifuge. Pattnaik (1956) notes that in Orissa the roots and leaves are used as a tonic and febrifuge and a decoction of the leaves serves in the treatment of headache and catarrh.. Deb (1968) reports that in Tripura the roots and leaves are used medicinally and the plant is "cultivated to make domestic compounds". Sharma (1975) reports that in Bengal it is cultivated as hedges around fields. Abraham and his associates (1974) asserts that *V. negundo* ranks second in effectiveness in insecticide properties against the Anguinois grain moth, *Sitotroga cerealella* Oliv., in stored paddy in Kerala.

Van Melle (1943) points out that, as with *V. agnus-castus*, the total effect [of *V. negundo*] "of the foliage is grayish, the leaves having a gray-woolly hairiness on the lower surface...the leaves are highly aromatic. They are effective, but rather exotic-looking and erect shrubs, not easily blended in the border and perhaps better used by way of garden accent plants or 'cut-back' garden hedge-rows. They flower at a time [in the U.S.A.] when there is not much else in bloom among the shrubs and, in the better, lavender-blue forms, contribute a worth-while decorative note to the small landscape. They thrive well in light, sandy soils, in full sun. Being coarse-rooted and difficult to dig with a ball of earth, they are best transplanted bare-rooted, in the spring. When they are treated as die-backs, the tenderness of the top-growth need not worry one. The roots are hardy enough; and should an occasional plant be lost in severe winters, these shrubs are worth planting again."

Steinmetz (1957) gives its distribution as "Ceylon, India, Burma, Indonesia, Australia, Northern China", reporting as present in the leaves an essential oil and a resin, in the fruit acids, resin, and coloring matter. He enumerates the uses of the leaves as an alterative, anodyne, bitter tonic, aromatic, febrifuge, discutient, and antiparasitic; of the roots as a tonic, expectorant, febrifuge, and diuretic; of the fresh fruit as a nervine, emmenagogue, and cephalic; and of the dried fruit as a vermifuge and to reduce an enlarged spleen.

Parker (1924) encountered it in "the Sub-Himalayan tract [of Pun-

jab] ascending to 4,000 feet from the Indus eastwards. Also Trans-Indus. Common. Often gregarious in small patches on the banks of streams and similar places. Grows readily from cuttings, and is often planted in hedges by natives. Young leafy shoots, planted nearly horizontally in the rains, appear to root better than older wood. The plant is likely to be useful for afforestation works, but not in very dry places."

Hansford (1957) records the fungus, *Asteridiella depokensis* Hansf., as parasitic on *Vitex negundo* in Java, based on "BO.2344". In his 1961 work he records *Irenopsis aciculosa* var. *viticis* (Rehm.) Stev. from the Philippines, based on Baker 1515. Bedi (1967) asserts that *Alectra parasitica* var. *chitrakutensis*, an alkaloid-containing scrophulariaceous plant traditionally used in the treatment of leprosy and other ailments, is often found growing on the roots of "white-flowering *Vitex negundo* in certain limited areas of India."

Tilak & Kale (1968) found the fungus, *Massaria kamatii*, on the dead stems of *Vitex negundo* in India, while in their 1969 work they report similar dead stems infested by the ascomycetes, *Gymnema montanum* Hook. and *Ophioceras petrakii* Tilak & Kale. In their 1970 paper they report another ascomycete, *Ostropa indica* (*O. idia*), also on dead stems; in their 1971 paper they add *Myttilidion kamatii*. Tendulkar (1972) reports *Diatrype viticis* from *Vitex negundo* in India. Livingstone (1976) lists the heteropterous insect, *Dasytingis rudis* Drake & Poor (*Tingidae*) as a sap-sucker on the *Vitex negundo* of India.

Puri (1960) reports that the leaves of this plant were tested for antibiotic properties and proved negative in respect to *Staphylococcus aureus*, *S. albus*, *Bacillus subtilis*, *Escherichia coli communis*, *Elerthella typhosae*, *Vibrio cholerae*, and *Klebsiella pneumoniae* and only partially inhibited the growth of *Shigella dysenteriae*.

Worthington (1959) claims that in Sri Lanka this species is often planted as a hedge, for ornament, or for medicinal purposes [all of which claims my wife and I verified while we were in that country], and that the leaves laid on stored grain act as an insect deterrent. Woodrow (1910) asserts that it "Is a useful and elegant fence plant [in the tropics] for a district with heavy rainfall and 2,000 feet altitude". Prain (1903) records it from Chota Nagpur, Bihar, Tirhut, north Bengal, and the Sundribunds. Collett (1902) lists it from the valleys below Simla, where it blooms from March to June, and asserts also that it occurs "Throughout India, ascending to 5000 ft." as well as in "Nearly all tropical regions".

Pételot (1953) summarizes the medicinal properties as follows: "L'espèce est connue des populations vietnamiennes, qui emploient ses feuilles, de saveur amère, un peu nauséuses, contre les rhumatismes et les fièvres intermittentes, elles sont aussi utilisées en bains contre le bérubéri, l'hémiplégie et la paralysie; parfois, elles sont fumées contre les céphalalgies. Enfin, elles sont préparées en décoction contre les coliques persistentes, dans les cas aigus de blennorragie (pissement de sang) et contre les enflures du corps."

"On se sert des racines comme fébrifuge en décoction à la dose de 30 g. de racines concassées pour un litre d'eau....Les fruits, préparés en décoction, sont ordonnés dans le cas de règles difficiles, les racines également de la même manière contre les maux de tête et pour faciliter les transpirations.

"D'après Poilane....les feuilles froissées, très odorantes, sont utilisées au Centre-Vietnam contre les douleurs. A cet effet, avec les feuilles, on compose un lit sur lequel on se couche.

"Tavera...parlant à la fois des *V. Negundo* et *V. trifolia* dit que les deux espèces, dont les pouvoirs thérapeutiques sont identiques, jouissent d'une grande réputation aux Philippines.

"Bontius appeta l'attention sur le *Vitex* disant que ses feuilles sont diurétiques et emménagogues.

Les feuilles, chauffées au feu et appliquées en grande quantité sur les articulations atteintes par les rhumatismes, sont très employées dans l'Union indienne, de même que dans l'Archipel malais. La décoction de ces feuilles s'emploie en bains guérir le bérubéri, de même que des bains de vapeur de cette décoction. On met une grande quantité de feuilles dans une marmite, autant que celle-ci en peut contenir sans les comprimer toutefois, puis on verse de l'eau et on pose sur le feu jusqu'à ébullition. On met le malade déshabillé sur un siège, en le couvrant d'une couverture de coton, puis d'une couverture de laine; ensuite, on met la marmite sous le siège en la retirant de temps à autre, jusqu'à provoquer une sudation abondante.

"Flemming....regarde les feuilles comme le meilleur résolutif contre les rhumatismes. Les indigènes les chauffent dans un pot de terre jusqu'à ce qu'elles puissent être supportées sans douleurs, les appliquent sur les parties douloureuses et les maintiennent en place à l'aide d'un bandage. On répète ces opérations trois ou quatre fois par jour.

"Dans l'Union indienne et aux Philippines, il existe une maladie caractérisée par une douleur intense localisée dans la plante des pieds et dont on ne connaît pas autre chose que le nom de 'brûlure de pieds', que les indigènes ont lui donne. Trois ou quatre applications de *Vitex* guérissent admirablement ces douleurs...Pour cela, on met les feuilles dans une marmite sans eau sur le feu et, lorsqu'elles sont très chaudes, on les applique sur la plante des pieds du malade en les maintenant bien au moyen d'une bande.

"Le Dr. W. Ingledew dit que les indigènes du Mysore se servent en bains de vapeur de la décoction des *Vitex* pour guérir les rhumatismes et les affections catarrhales fébriles. La décoction de ces feuilles est très employée aux Philippines, dans l'Archipel malais et dans l'Union indienne pour les bains des femmes à l'état puerpéral. Les feuilles sèches se fument pour guérir les maux de tête et les catarrhes.

"Selon le témoignage de certaines personnes, l'application de feuilles chauffées selon description ci-dessus, a donné de très bons résultats dans le traitement des orchites.

"La racine est tonique, fébrifuge et expectorante et le fruit emménagogue, selon les auteurs sanscrits.

"En Chine, les graines préparées en décoction servent contre les rhumatismes et les maladies nerveuses. On leur accorde les vertus

de consolider les dents, de réduire les maux de tête, les maux d'yeux et d'oreilles."

Hohenacker, on the label of a herbarium sheet, reports that the pulverized roots, cooked with rice, are spread as an application over leprous sores.

Various authors have supplied information regarding the natural distribution of the species in areas with which they were acquainted. Stewart (1972) lists it for "Trans Indus and the Indus eastward, ascending to 4000' in the Sub-Himalayan zone". Patel (1968) describes it as common throughout Melghat. Fosberg and his associates (1975) refer to it as "an infrequent Indo-Pacific plant in clumps" near the coast of Maug and Pagan islands. Van-katareddi (1969) found it "fairly common in open areas", while Singh (1969) calls it a denizen of "waste places". Cherian & Pataskar (1969) describe it as "common on hill slopes; Kaushik (1969) reports it "abundant in the basin of the Sindh river" in Madhya Pradesh; Vajravelu and his associates (1968) found it "very common" in Kerala, while Raju (1966) lists it from Andhra Pradesh.

Rechinger (1967) gives its overall distribution as northwest Pakistan, India, Sri Lanka, China, Japan, Taiwan, Hong Kong, Hainan, the Philippines, Java, Sarawak, east Africa, and Madagascar. He cites the nomenclatural type as "Herb. Linn. gen. 811 (790) no. 8". Blackburn (1952) limits its natural distribution (sens. strict.) to southern and southwestern China and India. This is probably the most correct, although its extension into Pakistan, Burma, and Sri Lanka is probably also original. Thwaites & Hooker (1861) report it common on the banks of rivers and streams up to an elevation of 3,000 feet in Sri Lanka.

Fournet (1978) reports it only cultivated in Guadeloups and Martinique, while Voigt (1845) found it in cultivation in Calcutta. Fletcher (1938) found it growing among limestone rocks and in village clearings, as well as cultivated in temple gardens in Thailand, giving its extended range as "E. Africa, India (type), Ceylon, French Indochina, Philippines, Hainan, China, Japan, and w. Polynesia" [this, of course, like so many of the overall distributions given by authors, obviously includes the quite separate ranges of the subspecific taxa (varieties and forms, and most probably also the range of *V. trifolia*, a species with which it is very often and consistently confused].

Gupta (1971) found *Vitex negundo* abundant in the tropical pine forests of Himachal Pradesh, commenting that "the leaves contain an essential oil". Kartawinata (1965) encountered it in the "fringes of the *Sophora tomentosa* association in Peutjang, near Java. Shah (1969), as well as Inamdar (1968, 1971), report it from Gujarat, while Sebastine & Ellis (1967) describe it as "very common near roads and pathways through dry evergreen vegetation with *Clerodendrum inerme* and *Ficus benghalensis*" in the Madras region, citing *Sebastine 10613*. Vajravelu & Rathakrishnan (1967) also refer to it as "very common" in Madras, citing their *no. 20613*. Misra (1970) refers to it as a "weed" in Bihar. Esfan-diari (1967) lists it from Baluchistan and Iran, citing unnumbered

collections by Alexandrov, Mirazayan, Rechinger, Rechinger, Esfandiari, & Allen, Safavi, and Scharf. Yamazaki (1966) lists it from 700--2000 m. in the eastern Himalayas, giving its overall distribution as "Afghanistan, Himalaya, India, Burma, Indo-China, and Malaya".

Monsalud & al. (1966) assert that the seeds are boiled and eaten in the Philippines and that the plant "Occurs in interior valleys and along seacoasts throughout the country". Merrill (1918) notes that "*Vitex negundo* Linn. is common and widely distributed in the Philippines at low and medium altitudes, perhaps introduced. Blanco's *Vitex leucoxylon* is, in part only, referable here." Fernandez-Villar (1880) reports it very common ["vulgatissima"] at Manila and adds that he saw live plants of this species in Luzon, Mindanao, Panay, and Cebu. Ahern's collector call it "a small shrub common in dry thickets, etc., throughout the Philippines". Wilson (1929) describes it as "the commonest shrub in the ancient kingdom of Pa [China]". Parsa (1949) lists it from Baluchistan, commenting that "cette espèce, originaire du nord de la Chine, est très rustique; sa floraison a lieu en Juillet."

Chioyenda (1916) lists it from the former Italian Somaliland. Osmaston (1927) tells us that in Kamæon it "Occurs throughout the area up to 4,500 feet. Common, especially bordering large streams, in dry river beds or in open miscellaneous forests of the Bhabar. It sometimes forms small gregarious patches," flowering from March to August. Patunkar (1980) reports that it is "with *Lantana aculeata*, among the dominant shrubs of small disturbed forests on the Deccan Plateau in Maharashtra State, growing along with *Annona squamosa*, *Acacia chundra*, *A. leucophloea*, *A. torta*, *Canthium parviflorum*, *Capparis brevispina*, *C. zeylanica*, *C. decidua*, etc."

Puri (1960) reports that in Coorg this species grows in sandalwood forests and that "in tropical moist deciduous forests of teak in pure mineralized soil which is colonized by xerophyllous species especially adapted for growing in pure sand there appear in descending order of frequency the first colonizers -- *Saccharum* sp., *Tamarix dioica*, then *Vitex negundo*, followed by *Acacia catechu* and then *Zizyphus oenoplia*." Banerji (1966) found it abundant in Nepal.

Dale & Greenway (1961) refer to *Vitex negundo* as a strand plant in Kenya, citing Jeffery 348. Hsiao (1978) reports that in Taiwan it is "common at low altitudes from north to south", giving its overall distribution as "Tropical East Africa to Asia and Polynesia", citing from Taiwan Henry 905, Nakazawa s.n., Tanaka 97, and Wilson 10972. Hallier (1918) cites the following collections: Java: Boerlage 463, Junghuhn 46. Sarawak: Haviland & Hose 1645E & 3552. Luzon: Hallier 4055, McGregor 5259, Merrill 3627, Ramos 8292, Rosenbluth & Tamesis 12708, and Vidal 1648. Banda: Reinwardt s.n. Mauritius: Sieber II.161. Thailand: Zimmermann 2.

Dunn & Tutcher (1912) list it from Hong Kong, New Territory, and Lantau Island. Trimen (1895) says that in Sri Lanka it inhabits "Low country, borders of streams, especially in the dry region, common; also much grown in native gardens. Fl[owers] all

the year; bright lilac-blue. Throughout India, Afghanistan, Eastern Asia, and the Philippine Is. There is no specimen or drawing in Herb. Hermann. Leaves sweetly aromatic when bruised. They are much used in native medicine as a fomentation in rheumatism; the root is also employed as a tonic." Gürke (1895) lists it from the Mascarene Islands, stating that it occurs there "Stets in der Nähe des Meeresstrandes".

Recent collectors describe *Vitex negundo*, in its typical form, as a large, erect, woody shrub, sometimes "semi-scandent", or a small tree or treelet, forming dense colonies, 3--10 m. tall, branching, aromatic, the branches wide-spreading or drooping, the leaves gray-tomentose beneath when fresh, the flower-buds pale-lavender, ill-smelling, the flowers sparse, not showy, the calyx pubescent, and the upper lip of the corolla 2-lobed, the lower lip 3-lobed with the middle lobe extra large.

The flowers [corollas] are described as "bluish" [Dey & al., 1969], "bluish or purplish-white" [Patel, 1968], "blue-purple" [Gupta, 1967], "bluish-purple" [Puri & al., 1964; Matthews, 1970], "blue or purple" [Banerji, 1966], "blue" [Suwal, 1969], "light purplish" [Hsiao, 1978], "purplish" [Alston, 1931], "purple" [Makins, 1936], "lavender" [Dunn & Tutcher, 1914; Fletcher, 1972], "violet" [Datta & Majumdar, 1966], "lavender-blue" [Baker, 1900], "lilac or lavender" [Baileys, 1976], "lilac-blue" [Worthington, 1959; Dale & Greenway, 1961], "bright lilac-blue" [Trimen, 1895], and "pale to deep blue with a yellow horseshoe mark" [Corner & Watanabe, 1969].

Collectors describe the corolla color as follows: "blue" on *Abedin & Qaiser 8646*, *Banerjee & al. 3532*, *Ingod & Pancha 201*, *Pancho 1184*, *Qaiser & Ghafoor 297*, *1191*, *1593*, *2003*, & *4495*, *Qaiser, Raza, & Hussain 1054*, "bluish" on *Taam 1728*, "pale-blue" on *Rajab 2*, "light-blue" on *Stevens 411*, "purplish-blue" on *Waas & Tirvengadam 810*, "blue-purple" on *Fosberg 56392*, "purplish" on *Moldenke & al. 28260*, "purple" on *Ali, Farooqi, & Abedin 1957*, *1958*, *1959*, & *1962*, *Qureshu s.n.* [13.11.1966 & 20.11.1966], and *Saldanha 16393*, "lavender" on *Hu 5607 & 10675* and *Moldenke & al. 28337*, "violet" on *Abedin 7701*, *Qaiser 209 & 222*, "light-blue, middle lower lobe with yellow & purple patches" on *Hu 8311*, "light-purple within with a white spot on lower lip" on *Moldenke & al. 28210*, "lilac, petals recurved" on *Comanor 778*, "violet, top of lower lip white" on *Davidse 7345*, "bright lilac-blue" on *Amara-tunga 1180 & 1362*, and "light bringel color" on *Qaiser & Ghafoor 7701*.

Collectors have found the plant growing in lateritic soil, in sandy loam, and in clay loam with gravel and stones, along fence-rows, on hillsides, in waste ground, secondary forests, and bamboo thicket along rivers, along roadsides, and on moist foothills and open grassy hillslopes. Pancho reports it "occasional in thickets [on Luzon] but common and widely distributed in the Philippine Islands, flowering all year, common in lower elevations, sometimes used as an insect repellent because of the odor of the leaves when crushed, powdered, or burned".

Taam found it to be abundant on dry level sandy ground among

scattered shrubs on Lantau Island. Saldanha refers to it as a common small tree in Mysore, but Banerjee & al. refer to it as "rare" in Nepal. Koelz encountered it at the borders of field in the deserts of Iran; Hu calls it a "common shrub" in Hong Kong. Davidse found it growing along the forested margins of rock outcrops in secondarily shrubby areas in Sri Lanka, while Worthington collected it on the same island in "an area of 90 inches rainfall".

The number of leaflets per leaf appears to vary considerably: on *Sivarajan CU.1848* the number was consistently 5, on *Sieber Fl. Maurit.8* it is 4; on *Moldenke 28260* it is all 3. On *Moldenke 28210* all the leaflets are 3 in number or a few are 5 with the central one petiolulate; on *Moldenke 28266* the leaflets are all 3 and all petiolate or the smaller leaves have the 2 basal leaflets sessile; on *Moldenke 28212* the leaves all have only 3 leaflets, the central one largest, the 2 side ones unequally petiolulate. On *Moldenke 28147* & *28260* the leaflets are all 3 in number and all are petiolulate (the central leaflet with the longest petiole on *28260*); on *Moldenke 28337* the leaflets are all 5 in number, of which only the 3 central ones are petiolulate; on *Moldenke 28332* the leaflets are all 3 in number with only the central one petiolulate, or else are mostly 3 in number with 2 leaves bearing 5 leaflets. *Qureshi s.n.* [13.11.1966] has the middle 3 of 5 leaflets 5--15 cm. in length! Extra long petiolarules are seen on *Abedin & Qaiser 8646*, *Qaiser 222*, and *Qaiser & Ghafoor 2003 & 7701*.

Pollen has been collected for study from *Comanor 778*. *Rechinger 30985*, in general appearance, looks very much like the wide-leafleted forms of *Vitex agnus-castus* var. *pseudo-negundo* Hausskn., with which it may well be a natural hybrid.

Recent collectors have found the plant in flower from March to August and in fruit from June to February. Authors give various flowering periods for the species for their particular regions: in Melghat it is said to bloom from June to December, in Delhi for the "major part of the year", in Sri Lanka "all year", and in Pakistan also "around the year". In Assam it is reported to fruit "in the cold season" and this applies also to the Melghat region; in Tripura it fruits "in winter". In Gorek it is said to flower and fruit for the "major part of the year" and in Gujarat it is also described as flowering and fruiting "practically throughout the year"; in Madhya Pradesh it flowers "after the rains". In cultivation in England it blossoms in "late summer or early autumn". Recent collectors have encountered it from sealevel to 2300 m. altitude.

Nisa & Qadir (1969) describe the seeds and their germination: "seed dormancy is due to the hard impermeable testa" which requires scraping with sandpaper, soaking in water, or treatment with sulfuric acid to be softened. The seeds are exalbuminous, hard, white, rough, ovoid, with vertical ridges present, a micropyle and hilum present; there are 2 cotyledons. The average weight of the seed is .045 gm. and its average diameter is 7 mm. Hypogeal germination was observed.

Sharma & Mukhophyay (1963) report the chromosome number as 34,

while Sobti & Singh report it as 26 and Malik (1963) as $2n = 24$ -- the differences probably attributable to misidentification of the specimens used, misidentification of herbarium material (and of living material) of this species and related species being as widespread as it is.

Madan & Nayar (1959) describe in detail the macroscopic and microscopic characters of the leaves and roots. Browne (1756) describes a *Vitex* from Jamaica as "Arboreus, foliis ovatis, crenatis, quinato-digitatis; petiolis communibus oppositis, racemis laxis alaribus.... This tree is frequent in St. Mary's, and grows generally to a very considerable size: it is easily distinguished by its crenated leaves, bunchy flowers, long berries, and the variegated under lip of its blossoms; the main division of which, is of the figure of a heart. The style is bifid, and each part pretty short." This plant he regarded as Linnaeus' *Vitex negundo*, but is it? The description, however, does not fit *V. umbrosa* Sw. either, nor *V. divaricata* Sw., the only two species of the genus known from the island.

Clarke (1885) includes *Vitex bicolor* Willd. and *V. arborea* Desf. in the synonymy of *V. negundo* L., but the former is now known as *V. trifolia* var. *bicolor* (Willd.) Mold. and the latter is *V. negundo* f. *albiflora* Mold. He gives the overall distribution of species as "Throughout India and Ceylon, in the warmer zone a universal plant..... Distrib. Cabul, E. Asia to the Philippines. A shrub or small tree hardly distinguishable from *V. trifolia* but by the points mentioned in the diagnosis [leaves 3--5-foliolate, leaflets petiolulate, lanceolate, entire or crenate, glabrate above, the under surface and the panicles closely white-tomentose, corolla 1/4 to 1/3 inch long, drupes 1/5 inch long, black]. The leaflets are frequently 5, the centre one at least usually distinctly petioluled, the flowers rather smaller." Obviously this is a description of *V. trifolia* var. *bicolor* in large part.

Merrill (1917), speaking of *C. B. Robinson 305* from Amboina, says: "The specimen, as Doctor Robinson notes, shows every intergradation between what is called *Vitex trifolia* Linn. and *V. negundo* Linn., a character that is also presented by many herbarium specimens sometimes placed under one name, sometimes under the other. It is strongly suspected that the two species, at least as currently interpreted, are really not distinct. The reduction of *Lagondium litoreum* Rumph. to *Vitex negundo* Linn. was made by Linnaeus, in Stickman Herb. Amb. (1754) 15, Amoen. Acad. 4 (1759) 126, Syst. ed. 10 (1759) 1122, which disposition of it has been accepted by practically all authors. Lamarck, Encycl. 2 (1788) 612, placed it under his *Vitex paniculata*, but *Vitex paniculata* Lam. is a synonym of *Vitex negundo* Linn. The 'species' has the range of *Vitex trifolia* Linn.

"*Lagondium nigrum* Rumph., extensively treated by Rumphius, Herb. Amb. 3: 52, and supposed to grow in Buru Island, is probably purely an imaginary plant. Regarding it, Hasskarl, Neue Schlüssel (1866) 75, states: 'fabula, nec arboris descriptio enerratur; arbor ex hac fabula intelligi haud potest.'"

Dietrich (1843), following Raeuschel (1797), uses the name, *Vitex negundo* for the eastern Indian population of this species, with the

leaflets "oblongo-lanceolatis subserratis subtus argenteo-lanatis" and *V. spicata* for the Chinese population with the leaflets "lanceolatis subrenatis subtus tomentosus". The "*V. negundo*" illustrated by Alexander (1971) actually represents its var. *cannabifolia* (Sieb. & Zucc.) Hand.-Mazz.

Several recent authors have proposed keys for distinguishing *Vitex negundo* from closely related species or for separating its infraspecific taxa. For instance, Townsend (1972):

1. Lower lip of the corolla glabrous or with only a few sparse hairs at the basal angles.....*V. agnus-castus*.
- 1a. Lower lip of the corolla bearded with a semicircular line of hairs at the base.
 2. Inflorescence with the lateral cymes more congested; inner surface of the calyx with the intermediate veins zigzag above or tending to merge into the reticulate secondary venation, extending from the middle of the tube upwards; petiolule of central leaflet to 1 cm. long.....
V. agnus-castus var. *pseudo-negundo*.
 - 2a. Inflorescence with the lateral cymes lax; inner surface of the calyx with the intermediate veins straight and almost reaching the sinuses, the secondary venation at most looping-anastomosing and never reticulate in the tube; petiolule of central leaflet to 2 cm. long.....*V. negundo*.

Patel (1971) gives the following:

1. Leaves 3- or 5-foliolate; leaflets petiolulate, lanceolate....
V. negundo
 - 1a. Leaves 3-foliolate or simple; leaflets sessile, ovate-oblong.
V. trifolia.
- Petzat & Rechinger (1967), on the basis of Iranian material:
1. Leaflets mostly in 3's or less; cymes very lax....*V. trifolia*.
 - 1a. Leaflets more numerous; cymes mostly dense.
 2. Flowers mostly in simple inflorescences or panicles; cymes sessile or subsessile; leaflets mostly 5--7.
 3. Lower corolla-lip not barbate within....*V. agnus-castus*.
 - 3a. Lower corolla-lip barbate within.....
V. agnus-castus var. *pseudo-negundo*.
 - 2a. Flowers mostly laxly paniculate; cymes plainly stipitate; leaflets mostly 3--5.....*V. negundo*.

Backer & Bakhuizen (1965) retain *V. paniculata* Lam. as separate from *V. negundo*, applying it to what we call *V. trifolia* var. *bicolor* (Willd.) Mold. Liu (1962) includes in typical *V. negundo* not only *V. paniculata* Lam. and *V. leucoxydon* Blanco, but also such disparate taxa as *V. bicolor* Willd. and *V. cannabifolia* Sieb. & Zucc.

Dunn & Tutcher (1912) use the following differentiation:

1. Calyx truncate, denticulate.....*V. trifolia*.
 - 1a. Calyx acutely dentate or lobed.....*V. negundo*.
- Alston (1931), using Sri Lankan material:
1. Leaflets 3, elliptic-lanceolate, stalked or not...*V. trifolia*.
 - 1a. Leaflets 5, lanceolate, stalked.....*V. negundo*.

Prain (1903), using African material:

1. Leaflets 3 or 1, sessile, obovate or obovate-oblong, entire...
.....*V. trifolia*.
- 1a. Leaflets 3 or 5, petiolulate, lanceolate, entire or rarely
crenate.....*V. negundo*

Trimen (1895), using Sri Lankan material:

1. Leaflets oblong-oval, obtuse.....*V. trifolia*.
- 1a. Leaflets linear-lanceolate, acute.....*V. negundo*.

Jafri & Ghafoor (pers. comm.), using Pakistan material:

1. Leaflets (1)--3; cymes lax, calyx 4--5 mm. long...*V. trifolia*.
- 1a. Leaflets (3)--5--7; cymes slightly lax to dense; calyx 2--3
mm. long.
 2. Leaflets 3--5; cymes often somewhat lax and paniced, forming a pyramidal inflorescence; flowers not fragrant.....
V. negundo.
 - 2a. Leaflets 5--7; cymes sessile or subsessile, forming a sub-cylindric narrow inflorescence; flowers fragrant.
 3. Lower corolla-lobe glabrous or slightly pubescent at the base only.....*V. agnus-castus*.
 - 3a. Lower corolla-lobe densely ciliate or pubescent.....
V. agnus-castus var. *pseudo-negundo*.

Kuntze (1891) offers a very interesting subspecific key:

1. Foliola 5--7 media subsessilia vel petiolulata.....
V. agnus-castus ♂ *typica*.
- 1a. Foliola 3--5 in eadem stirpe.
 2. Foliola omnia sessilia, 1: 1 1/2 -- 4.....
V. agnus-castus β *trifolia*.
 - 2a. Folia media 1--3 petiolulata.
 3. Foliola 1: 2 1/2 -- 4.....*V. agnus-castus* γ *negundo*.
 - 3a. Foliola 1: 5--8.....*V. agnus-castus* δ *negundodes*.
 - 3b. Foliola 1: 1--2.....*V. agnus-castus* ε *javanica*.
- 1b. Foliola 1--3.
 4. Folia plurima ternata; foliola 1: 2.....
V. agnus-castus ♂ *subtrisecta*.
 - 4a. Folia plurima vel omnia simplicia; foliola 1: 1 -- 1 1/2..
V. agnus-castus η *ovata*.

He comments that "Schauer, Bth. etc. ziehen mit Recht die ostsiatische *V. ovata* Thbg. zu *trifolia*, ebenso S. Kurz diese zur mediterranen *V. Agnus-castus* (=♂ *typica*); Kurz lässt noch *V. Negundo*, die Clarke richtig als hardly distinguishable von *V. trifolia* beziehn, nur durch die gestielten Mittelblättchen abge sondert, aber das ändert bei ♂ *typica* ebenfalls. Ich sammelte 2 weitere Mittelformen. Sonstige Unterschiede existiren nicht."

Various authors have cited material which they considered to represent typical *Vitex trifolia*. Diels (1902), for instance, cites GL.1370 & 1372, Niederlein 115, and Rosthorn s.n. from central China. Baker (1900) cites Hildebrandt 1254 from Tanzania, noting "Also in tropical Asia and Madagascar". Williams (1905) cites Zimmermann 2 from Thailand, while Fletcher (1938) lists Curtis s.n., Kerr 3657, 4286, & 16627, Lakshnakara 664, Marcan 263, Wilkinson 20799, and Zimmermann 2 from the same country. Diels (1913) cites Forrest 1096 from China, while Lam (1919) lists

Berhout 440 from Banka, Teijsmann 16728 from Billiton, Hance 951 from Whampoa, and Zimmermann 442 from China.

Fedde & Schuster (1941) cite Boerlage 483 and Junghuhn 46 from Java, Haviland & Hose 1645 & 3552 from Borneo, and Darling 16562, McGregor 5259, Merrill 3627 and Ramos 8292 from the Philippines, but include *V. incisa* Lam. in the synonymy.

From India there are many citations recorded in literature, of which the following are some: Puri and his associates (1964) cite Blatter & Hall s.n. and Jain 40159 & 40164; Joseph & Vajravelu (1967) cite their no. 13521; Rao & Kumari (1907) no. 20082; Vyas (1967) nos. 255 & 409; Billore & Hemadri (1969) no. 115608; Cherian & Pataskar (1969) Rolla 109325 & 111153; Singh (1969) nos. 25412, 25539, & 33512; Venkatarreddi (1969) nos. 93216 & 95773; Malhotra & Moorthy (1971) nos. 118757, 123378, 123567, & 134962. Ellis & al. (1967) cite no. 18696 from Kerala; Vajravelu & al. (1968) cite Joseph 17107 from the same state. Tiwari (1968) refers to his no. BXXXV.1115 from Madhya Pradesh, and from the same state - Saxena (1970) Khotele 6863 and Saxena & Khotele 5880, and Saxena (1971) Saxena & Pandey 83395 & 83555, as well as Saxena & Khotele (1976) Khotele 9387. Thakar & al. (1970) cite B.5018 from Gujarat. Srivastava (1976) lists his no. 502 from Gorak.

Patzak & Rechinger (1967) cite Koelz 14219 from Iran and Cleg-horn 2638, Hatt s.n., Koelz 4137, Rechinger 19617 & 30985, and Stewart 17067 from Pakistan. Hartley and his associates (1973) cite their nos. 10466 & 10870 from Huon Gulf, while Fosberg & al. (1975) list Falanruw 2246 from Maug island and Falanruw 1858 and Moore 423 from Pagan island.

Cooke (1905) cites from Bombay Dalzell s.n. and Talbot s.n., from Konkan Woodrow s.n., from Deccan Cooke s.n., and from Sind Cooke s.n. He gives the species' overall distribution as "Throughout India; Ceylon, Afghanistan, Philippine Islands".

Karavaev (1976) cites a Rheede Expedition (1674--1675) specimen from Malabar in the Moscow University herbarium - doubtless the type of Rheede's *Bem-nosi*.

Many herbarium collections, in various herbaria, have been mis-identified as typical *Vitex negundo* L., but are something different. Among these may be mentioned the following:

Moran 2458 is *Vitex agnus-castus* L.

Ali 5 & 1074, Andersen & Petersen 443, Iman 32, Long 4D, Qaisar 209, Qaiser & Ghafoor 1525, and Rechinger 19617 & 30985 are *Vitex agnus-castus* var. *pseudo-negundo* Hausskn.

Elmer 5611, Merrill 3627, and Pancho 285 are *Vitex elmeri* Mold.

Cheng 3366, Chin 843, En 2810, Hu 10244, Poore 296, G. Thomson s.n. [Maisor & Carnatic], T. Thomson s.n. [Punjab, 1-4000 ped.], and Wan & Chow 79016 are *Vitex negundo* var. *cannabifolia* (Sieb. & Zucc.) Hand.-Mazz.

Rowell 5801 is *Vitex negundo* var. *heterophylla* (Franch.) Rehd.

Chiao 22343, Hu 6858 9243, Kapoor & Thamann 27194, Koelz 8278, Liang 63036, and Wroten C.423 are *Vitex negundo* var. *intermedia* (P'ei) Mold.

Elmer 8125, Herb. Hort. Bogor. XV.J.A.XXXIV.6, Koorders 42133b, Merrill 1503, 1636, 2320, & 3429, Merrill Sp. Blanc. 440, and Teijs-

mann 16728 are *Vitex negundo* var. *philippinensis* Mold.

Fortune 25 is *Vitex negundo* f. *purpurascens* Sivarajan & Mold.
Keng & al. K.6223 is *Vitex siamica* F. N. Will.

Comanor 778, Tanner RT.2960, and T. Thomson s.n. [Punjab, 1-4000 ped.] are *Vitex trifolia* L.

Ahern 166, 223, 255, 671 [71], & 814 [28], Balgooy 2305, Baumann-Bodenheim 5176, Bloembergen 4788, Borden s.n. Herb. Philip. Forest Bur. 2035], Brass 21928 & 28095, Burgess 40403, Cailipan s.n. [Herb. Philip. Forest. Bur. 25637], W. W. Clark s.n. [Herb. Philip. Forest. Bur. 2527], Cockburn 68408, Elmer 11999, Fosberg 56425, Lütjeharms 4655, Meier SAN.58806, R. Meyer s.n. [Herb. Philip. Forest. Bur. 2276], Riley 52, Robinson 305, J. V. Santos 5258, Stone 10962, Sumithrarachchi & Jayasuriya DBS.232, Tan s.n. [SAR.28818], Tanner 2960, Whitford 853, and R. S. Williams 185 & 2978 are *Vitex trifolia* var. *bicolor* (Willd.) Mold.

Addru 173 is *Vitex trifolia* var. *bicolor* f. *albiflora* (Kuntze) Mold.

Soepadmo KLU.9116 and Soepadmo & Mahmud 9173 are *Vitex trifolia* var. *simplicifolia* Cham.

Soepadmo KLU.9173 is *Vitex trifolia* var. *simplicifolia* f. *albiflora* (Y. Matsumura) Mold.

Alsterlund 9, Elmer 7877, and Shah MS.1212 are *Vitex trifolia* var. *subtrisecta* (Kuntze) Mold.

Gillespie 2953 & 4164 are not *Vitex* -- their leaves are lepidote; they have the aspect of *Petraeovitex*.

Shrestha 1748 is a species of *Buddleia*

Sieber Fl. Maurit. II.161 is not verbenaceous and *Nigan* s.n. is probably not verbenaceous.

Additional citations: LOUISIANA: Richland Par.: P. White 175 (Ne--82898). St. Mary Par.: Dooley 488 (Ne--70904). OKLAHOMA: Marshall Co.: Duff 59 (Tu--129548). MASCARENE ISLANDS: Mauritius: Sieber Fl. Maurit. 84 (E--116186, Mu--665). IRAN: Koelz 14219 (W--2194244). PAKISTAN: Baluchistan: Ali, Farooqi, & Abedin 1957 (Kh), 1958 (Kh), 1959 (Kh), 1962 (Kh); Ghafoor & Qaiser 297 (Kh, Kh, Kh); Qaiser 209 (Kh); Qaiser & Ghafoor 1191 (Kh), 1593 (Kh); Qaiser, Raza, & Hussain 1054 (Kh). Northwestern States: Abedin 7701 (Kh); Abedin & Qaiser 8646 (Kh, Kh); Qaiser & Ghafoor 2003 (Kh, Kh), 7701 (Kh). Sind: Ahlotar s.n. [26.10.1958] (Kh). West Punjab: Qaiser & Ghafoor 4495 (Kh). NEPAL: Banerjee, Upadhyay, & Baskala 3532 (W--2581505). INDIA: Assam: Chatterjee s.n. [April 1902] (Pd); Jenkins s.n. [Assam] (Mu--661); Masters s.n. [Assam] (Mu--662, Pd). Karnataka: Saldanha 16393 (W--2653610); W. D. Stevens 411 (Ln--232295). Kerala: Hohenacker 160 (Mu--663); Silcarajan 42 (Uc), 142 (Ld), CU.1848 (Ac); Stocks, Law, & c. s.n. [Malabar, Concan] (Pd). Sikkim: Prain's Collector s.n. [18/5/1903] (Pd). Uttar Pradesh: Dimri 79 (Pd); Kunar 79 (Pd). West Bengal: T. Thomson s.n. [1-4000 ped.] (Pd); Thomson & Hooker s.n. [Plan. Ganget. Inf.] (Mu--657, Pd). State undetermined: Bojer s.n. [ex India orient.] (Mu--690); Collector undetermined s.n. [Lamber, 7th June 1802] (Pd); Griffith s.n. [India orientali] (Mu--638); Hügel s.n. (Mu--659, Mu--660); Quilon 766/1830 (Pd); Wight 2324 (Mu--1351, Pd). MALDIVIVE ISLANDS: Dunnika: Ibidi 123 (Pd).

Malé: *Christopher s.n.* [1888] (Pd). Turadu: *Gardiner s.n.* [1899-00] (Pd). Vermiandu: *Gardiner s.n.* (Pd). SRI LANKA: *Amaratunga 1180* (Pd), *1362* (Pd); *Burman 60* (M, Mu--664); *Comanor 778* (Ac); *Davidse 7345* (Ld, W--2803434); *F. R. Fosberg 56392* (N, W--2811452); *Gardner s.n.* [Thwaites C.P.1956; Jaffna] (Pd): *Moldenke, Moldenke, & Jayasuriya 28212* (Ac, Gz, Kh, Ld, Pd, Tu, W); *Thwaites C.P. 1956* [Peradeniya] (Pd); *Waas & Tirvengadam 810* (Ld, W--2806291); *Worthington 184* (K), *6378* (K). CHINA: Kwangtung: *Chow & al. 78054* (N, W--2895176). CHINESE COASTAL ISLANDS: Lantau: *Taam 1728* (Ba, N). HONG KONG: *Hu 5607* (W--2711383), *8311* (W--2711252), *10675* (W--2732107). MALAYSIA: Selangor: *Kasim bin Rajab 2* (K1--1002). TAIWAN: *Hsu & Kao 3400*(S); *Tanaka & Shimada 17878* (Mu). PHILIPPINE ISLANDS: Luzon: *Ahern's Collector 102* (Mi, W--1584133); *Castillo s.n.* [Herb. Philip. Bur. Sci. 22747] (W--897948); *Elmer 5611* (W--852861), *18119* (Mi, W--1237575); *F. C. Gates 6187* (Ws): *Ingod & Pancho 201* (Ba); *Loher 4432* (Mu--3965, W--446878), *4433* (W--446879), *6531* (Mu--4215); *Mangubat s.n.* [Herb. Philip. Bur. Sci. 1343] (W--439798); *E. D. Merrill 147* (W--435146), *1503* (W--436461), *1636* (W--436590), *2320* (W--437268), *2876* (W--437846), *2917* (W--437887), *3429* (W--438411), *3627*(W--438490), *Sp. Blanc. 440* (W--904117); *Otanes s.n.* [Herb. Philip. Bur. Sci. 17995] (W--898105); *J. V. Pancho 1112* (Ba), *1184* (Ba); *Quisumbing s.n.* [Philip. Nat. Herb. 18826] (W--2214859); *Wilkes s.n.* [near Manila] (W--40648). CULTIVATED: California: *McCaskill 346* (Se--166705, Tu--118723). India: *Herb. Hort. Bot. Calcut. s.n.* (Pd); *Wallich 1744/2* (Pd). Java: *Herb. Hort. Bot. Jav. s.n.* (Pd). Louisiana: *Hamlin s.n.* [4-16-72] (Ne--65026); *P. White s.n.* [3 July 1969] (Ne--33943). North Carolina: *Pratt s.n.* [October 7, 1964] (Lv). Pakistan: *Hu-sain s.n.* [12.10.1957] (Kh); *Qaiser 222* (Kh, Kh); *Qureshi s.n.* [20.11.1965] (Kh, Kh), *s.n.* [13.11.1966] (Kh, Kh). Sri Lanka: *Moldenke, Moldenke, Dassanayake, & Jayasuriya 28332* (Ld, Pd, W--2764538), *28337* (Gz, Pd, W--2764547); *Moldenke, Moldenke, & Jayasuriya 28147* (Pd, W--2764410), *28210* (Ac, Gz, Kh, Ld, Pd, Tu, W--2764471); *Moldenke, Moldenke, & Silva 28260* (Pd, W--2764526); *Moldenke, Moldenke, Jayasuriya, & Sumithraarachchi 28266* (Ac, E, Gz, Kh, Ld, Pd, Tu, W--2764505); *Worthington 1976* (K).

VITEX NEGUNDO f. *ALBA* P'ei

Additional bibliography: Hocking, *Excerpt. Bot. A.12*: 570. 1968; *Mold., Phytologia 17*: 15--17. 1968; *Mold., Fifth Summ. 1*: 291 (1971) and *2*: 927. 1971; *Mold., Phytol. Mem. 2*: 280 & 592. 1980.

VITEX NEGUNDO f. *ALBIFLORA* Mold.

Additional bibliography: Moon, *Cat. Indig. Exot. Pl. Ceyl. 46*. 1824; *Buek, Gen. Spec. Syn. Candoll. 3*: 501. 1858; *Pételot, Pl. Méd. Camb. Laos Vietn. 2*: 248 (1954) and *4*: 171. 1974; *Bedi, Econ. Bot. 21*: 277, 279, & 281. 1967; *Bedi, Hortic. Abstr. 38*: 517. 1968; *Mold., Phytologia 17*: 17, 22, & 23. 1968; *Mold., Résumé Suppl. 16*: 13 & 29. 1968; *Mold., Fifth Summ. 1*: 374 (1971) and *2*: 713 & 927. 1971; *Mold., Biol. Abstr. 50*: 418. 1969; *Mold., Phytologia 44*: 391 (1979) and *45*: 491. 1980; *Mold., Phytol. Mem.*

2: 367 & 592. 1980.

Moon (1824) seems to refer to this white-flowered form as occurring in Sri Lanka, listing the vernacular name, "sudu-nika", for it there. Bedi (1967, 1968) asserts that *Alectra parasitica* var. *chitrakutensis* grows as a parasite on the roots of "white-flowering *Vitex negundo*" in certain limited areas of India. It is an alkaloid-producing plant traditionally used in the treatment of leprosy.

VITEX NEGUNDO var. *CANNABIFOLIA* (Sieb. & Zucc.) Hand.-Mazz.

Additional synonymy: *Vitex negundo castaneaefolia* Everett, Cat. Hardy Trees Shrubs 120. 1942.

Additional bibliography: Kwa-wi [transl. Savatier], Arbor. 4: pl. 1. 1759; Benth. in Benth. & Hook., Gen. Pl. 2 (2): 1154. 1876; C. B. Clarke in Hook. f., Fl. Brit. India 4: 584. 1885; Sakaguchi, Gen. Ind. Fl. Okin. 18-19. 1924; Stapf, Ind. Lond. 6: 478. 1931; Everett, Cat. Hardy Trees Shrubs 120. 1942; Hara, Enum. Sperm. Jap., imp. 1, 1: 190. 1948; H. N. & A. L. Mold., Pl. Life 2: 69. 1948; Hatta, Kubo, & Watanabe, List Med. Pl. 15. 1952; Naito, Sci. Rep. Kag. 2: 60. 1953; Masamune, Sci. Rep. Kanazawa Univ. 4 [Enum. Trach. 7]: 48. 1955; Roi, Trait. Pl. Méd. Chin. 411 & 484. 1955; Liu, Illustr. Nat. Introd. Lign. Pl. Taiwan 2: 1229, fig. 1037. 1962; Hyland, U. S. Dept. Agr. Pl. Invent. 168: 7. 1967; Mold., Phytologia 17: 15 & 17--20. 1968; Mold., Résumé Suppl. 16: 29. 1968; D. R. W. Alexander, Hong Kong Shrubs 105. 1971; Mold., Fifth Summ. 1: 134, 208, 270, 279, 291, 293, 294, 298, 311, 328, & 374 (1971) and 2: 660, 714, 715, 721, 723, 724, & 927. 1971; Priszter, Delect. Sem. Spor. Pl. Hort. Bot. Univ. Hung. 59. 1971; Hara, Enum. Sperm. Jap., imp. 2, 1: 190. 1972; Kooiman, Act. Bot. Neerl. 24: 462. 1975; Mold., Phytologia 31: 389 (1975) and 34: 266. 1976; E. H. Walker, Fl. Okin. South. Ryuk. 894. 1976; C.-W. Li, China Recunst. 27 (2): 4. 1978; Li, Nan-fang 100--102 & 168, fig. 29. 1979; Mold., Phytologia 45: 485. 1980; Mold., Phytol. Mem. 2: 126, 198, 258, 266, 280, 282, 283, 287, 298, 302, 303, 319, 367, & 592. 1980; Hu, Enum. Chin. Mat. Med. 45 & 219. 1981.

Additional illustrations: D. R. W. Alexander, Hong Kong Shrubs 105 (in color). 1971; Li, Nan-fang 102, fig. 30. 1979.

Recent collectors describe this plant as a low shrub, 1--2.3 m. tall, often gregarious, suckering from the base, the flowers sweet-scented, and the immature fruit green. They have found it growing on grassy hillsides and slopes, at the edges of forests, on dry land, along roadsides, and in dry, rocky, and grassy places in general, but, according to Chin, "NOT on limestone", at 50-220 m. altitude, in anthesis in March, May, July to October, and December, and in fruit in July. Tsiang refers to it as "common" in Kweichow.

The corollas are said to have been "pale-blue" on *Chin 843* and *Poore 296*, "lavender-blue" on *Hu 10244*, "mauve" on *Rhodes 47-64-1222*, and "greenish" on *Tsiang 8518*.

The leaf-margins on what appears to be the type collection, an unnumbered Siebold collection, are remarkable for their fine appressed teeth. In most other collections the teeth are larger

and more erect.

Walker (1976) notes that this variety is reported by Masamune (1955) from Ishigaki and Iriomote islands, but that "This has not been verified". Hyland (1967) reports it cultivated in Maryland, citing *U. S. Dept. Agr. Pl. Invent.* 262787 from Japan. Masamune (1955) regards the "*V. negundo* L." of Sakaguchi (1924) and of Naito (1953) to be var. *cannabifolia* rather than the typical form of the species. He records the variety also from Taiwan, the Philippines, Hainan, Fukien, Honan, Kiangsu, Anhwei, Chekiang, Hupeh, Szechuan, Kwangtung, Yunnan, Malaya, Madagascar, and "Africa", but it seems obvious that he is here referring to the species as a whole. The Rhodes collection, cited below, was taken from a plant grown in Canada from seed secured from Portugal. Priszter (1971) offers seeds to horticulturists as his no. 1674.

Vernacular names reported for the variety are "hem-leaved vitex", "hoang king", "huang-ching-tau", "merboh", "mou-ching", "sizo king", "taiwan-ninzinboku", and "tch'ou king li". Hu (1981) reports that the plant appears in Chinese materia medica under the trade name of "*Fructus Vitis Cannabifoliae*".

It should be noted that the illustration given by Liu (1962) as representing var. *cannabifolia* actually represents typical *Vitex negundo* L. The Schneider (1911) reference in the bibliography (above) is sometimes cited as "1912", but appears actually to have been published in 1911. The Bentham (1876) reference is usually cited as "Bentham & Hooker", but, as painstakingly recorded by Bentham himself ["On the joint and separate work of the authors of Bentham and Hooker's *Genera Plantarum*" in *Journ. Linn. Soc. Lond. Bot.* 20: 304--308. 1883], the section on *Verbenaceae* was authored by Bentham alone.

Roi (1955) lists this plant as among the medicinal plants of China. Li (1978, 1979) asserts that it is "a common plant widely distributed in northern [and] central to southern China. The leaves are palmately compound, generally with five leaflets below and three toward the top of the stem. The use of *Vitex* for witchcraft is.....mentioned in the much later work of Wu Ch'i-chün who says that 'There is a kind of ching in Kiangsi. Near the root there are three leaflets, above that four, five, six, and seven leaflets successively. The natives there said those with wholly seven leaflets can be used to control demons and ghosts'. This passage is probably referring to some morphogenetic variations of the very common species *Vitex negundo* L. and its varieties. Those variations, to the ancients or uninitiated, may have seemed to signify magical powers. It also shows that the superstitions pertaining to *Vitex* mentioned by Chi Han persisted in some parts of southern China to at least the nineteenth century. The use of the Mou-ching as a magical plant seems to have originated in the north but it had special significance in the south. In the Han-shu.... it says that Mou-ching was used as designs to depict the sun, moon, and stars on pennants for religious ceremonies initiating the conquest of Nan-yüeh. The commentary of Chin Chu says that the inter-joints [internodes] of Mou-ching are not equal, and that it is cut, when the moon has a halo, into a sign to scare sick people.

This statement is significantly similar to the description of Mou-ching in Ning-p'u as given by Chi Han and by P'ei Yüan.

"*Vitex cannabifolia*.....[is a] medicinal herb widely used for cough and asthma in the southern provinces of Kiangsu and Chekiang." Chemical analysis shows the presence of volatile oils containing 17 elements effective in the treatment of and prevention of bronchitis. Oil extracted from the leaves is made into capsules and an emulsion and the "Results are better than with herbal brews. It readily reduces or eliminates patients' symptoms. Inflammatory epithelial lesions of bronchus mucosa improve markedly." He asserts that this plant is opening up "vast resources for a medicine that can be collected and processed locally" and which is now the "leading drug in preventing and treating chronic bronchitis in China" -- also helpful in reducing incidence of pulmonary emphysemas and pulmonary heart disease."

Alexander (1971) reports the plant "Very common in Hong Kong, growing in thickets on hillslopes at lower level. Seeds, roots and leaves are of medicinal value. Young shoots are useful for weaving baskets."

The late O. F. Cook, writing from San Antonio, Texas, in a typescript dated April 10 and September 23, 24, 26, and 27, 1911, and very kindly made available to me by my good friend and colleague, Dr. Velma Rudd, gives a very interesting description, with illustrations, of anisophylly in this variety: "Leaves opposite, decussate, nut each alternate pair unequal, the leaf on the upper or inner side being smaller than the others. This remains true regardless of actual exposure, showing that the inequality is determined in advance of actual conditions of growth, though it may depend upon position in the axil next to the main stalk, which may be unfavorable. The inequality is greatest at the base of the shoot, becoming gradually less.

"It would be of interest to determine whether the inequality is one of size only, which might be judged by comparison of shapes of leaves of equal pairs with those of unequal pairs.

"Effect on inflorescences. The inflorescences that terminate the branches are supplemented by lateral inflorescences from the axils of the upper leaves. If these represent an equal pair two supplemental inflorescences are produced, while if the last pair is unequal there is only one supplemental inflorescence, from the axil of the larger leaf. As the small leaf that fails to produce an inflorescence branch is on the upper side and the large leaf on the lower two-branched inflorescences usually have a vertical position, one branch above another[sic].

"Inequality of floral bracts. Anisophylly does not cease with the foliage leaves, but may be shown very distinctly in the long, narrowly linear bracts that subtend the branches of the inflorescence. The bracts that subtend lateral branches are nearly equal, while those of superior branches are shorter than those of inferior branches. The bracts are often deeply bifid and sometimes split completely to the base, so as to appear double. This tendency to division may be considered as a reflection or translocation of characters from the inflorescence branches which are pseudo-dichotomous in the

lower joints, by the regular abortion of the terminal buds and the development of two subterminal. The distal portions of the inflorescence branches become sympodial, for on joints that are to produce fruit only one subterminal bud develops.



Fig. 1. Leaves showing the plan of having each alternating pair unequal

"Leaves of unequal pairs are more symmetrical than those of equal pairs. The phenomenon of anisophylly is not confined to the upper and lower rows of leaves, but is frequently reflected in differences between the upper and lower halves of the lateral or equally-paired leaves. Indeed, it is a general rule that the leaves of equal pairs are less symmetrical than those of unequal pairs. Inequalities between the two halves of the lateral leaves are most apparent on branches where the anisophylla of the upper and lower leaves is most pronounced. The most frequent and obvious form of inequality is that of the basal lobes which are often much larger on the ventral side of the leaf than on the dorsal. Or there may be an additional lobe on the ventral side of the leaf not represented on the dorsal side.

"In addition to the differences of the basal division the other divisions of the lower side of the leaf are usually larger than those of the upper side, though they may be less deeply lobed. Indeed, the larger of the inferior divisions often exceeds the median division in size.

"Anisophylly is a term used to indicate a condition of inequality of leaf development on the upper and lower sides of specialized lateral branches.

"Some plants have all the branches alike, at least in the form and arrangement of leaves, while other plants produce two or more kinds of branches, sometimes with definitely different kinds of leaves. Plants that have the lateral branches different from the upright branches are likely to show the phenomenon of anisophylly. One of the most frequent specializations of lateral branches is that of producing only two rows of leaves, one on each side, as in coffee and in the Central American rubber tree (*Castilla*). In such cases the leaves of the lateral branches are equal. The phenomenon of anisophylly appears on plants that have the lateral branches somewhat specialized, but with more than two rows of leaves.

"Though not at all confined to opposite-leaved plants, the condition of anisophylly is much more readily recognized and more readily studied on such plants than on those that have less definite arrangements of leaves. When the leaves that grow out at the same time and from the same place on the same branch are regularly unequal some definite factor of development must be involved. To observe the workings of this factor and, if possible, to connect it with other external conditions or internal factors of heredity is a matter of scientific interest.

"This plant affords several unusual advantages for the study of anisophylly. In addition to the opposite leaves, the square stems and decussate arrangement make it very easy to follow the different rows of leaves, and the highly specialized, palmately divided form of the leaves makes it possible to institute several comparisons and to secure by simple inspection much more definite results than could be obtained from simple-leaved plants without resorting to elaborate measurements.

"Differences of form in leaves of the same pair. If the inequality of the leaves of the same pair were limited to differences of

size alone there would appear to be more reason in ascribing the inequality merely to differences of position, exposure or nutrition, and less reason to look upon the inequality as a definite



Fig. 2

hereditary specialization. But when the forms of the leaves that belong to the same dorso-ventral pairs are observed it soon becomes evident that the inequality has been provided for very far back in the development of the shoot, when the original plans or primordia (Anlagen) of the leaves were laid down. The differences



Fig. 3

are not merely matters of size but often represent quite profound differences of form. The lobes are not only differently cut, but often differ in number, the usual figures being five in the upper leaf and seven in the lower. Some will be seen where the middle lobe is deeply cut -- or the basal divisions may be lobed in the small leaf, entire in the large.



Fig. 4. Showing irregular notching in opposite pairs of leaves



Fig. 5. Showing differences in alternating pairs of leaves

"Inequality not lost with change of position. On lower horizontal or drooping branches the relations of the leaves and exposure to light are often completely changed. If a branch grows in a horizontal instead of an obliquely ascending direction the equal pairs of leaves stand above and below the branch, while the unequal pairs take the lateral positions along the sides. If the inequalities of size and form depended directly on gravitation or exposure to light they should be seriously modified by these changes in the position of the developing branches, but in reality no such changes appear. Unequal pairs though growing in lateral positions show as pronounced inequalities as when growing in vertical positions...."

[to be continued]